

**FINAL REPORT  
MARCH 2003**

**REPORT NO. 03-07**



**Ammunition Peculiar Equipment (APE) 1995, NIR Propellant Analyzer, to MIL-STD-398, "Military Standard Shields, Operational for Ammunition Operations, Criteria for Design of and Tests for Acceptance."**

**Prepared For:**

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U.S. Army Defense Ammunition Center  
ATTN: SJMAC-DEM  
1 C Tree Road, Bldg 35  
McAlester, OK 74501-9053

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**VALIDATION ENGINEERING DIVISION  
MCALESTER, OKLAHOMA 74501-9053**

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**REPORT NO. 03-07  
APE 1995 NIR PROPELLANT ANALYZER,  
MIL-STD-398 TESTS**

**March 2003**

**ABSTRACT**

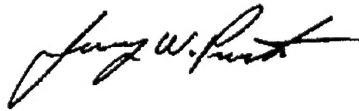
The U.S. Army Defense Ammunition Center (DAC), Validation Engineering Division (SJMAC-DEV), was tasked by DAC, Maintenance Engineering Division (SJMAC-DEM) to test the Ammunition Peculiar Equipment (APE) 1995 NIR Propellant Analyzer, to MIL-STD-398, "Military Standard Shields, Operational for Ammunition Operations, Criteria for Design of and Tests for Acceptance." The test was conducted with the APE 1995 fully loaded with M1 propellant and placed inside the FOSS 5000 Near Infrared Spectrometer. The ignition of this propellant was for test purposes only and not part of normal operations for testing the M1 propellant.

The APE 1995, as tested by ignition of the M1 propellant, provides operator protection in accordance with MIL-STD-398, "Military Standard Shields, Operational for Ammunition Operations, Criteria for Design of and Tests for Acceptance." The ignition of the M1 propellant in the APE 1995 was for test purposes only and not part of normal operations for testing the M1 propellant. If the ignition of the M1 propellant occurs in the APE 1995, the fixture will be rendered unusable and shall be returned for refurbishing to SJMAC-DEM, Defense Ammunition Center, 1 C Tree Road, Building 35, McAlester, OK 74501-9053. The reason the APE 1995 must be refurbished in the event of an inadvertent ignition within the fixture is because of the flame and heat associated with the M1 propellant burning. Test pressure results revealed a maximum of 0.28050 psi with a maximum sound pressure of +47 decibels and a maximum temperature of 1593.52 degrees F. The high temperature and the 3-foot radius of the burning propellant grains provided evidence that it would be dangerous for

an operator to be within 3-foot radius to the APE 1995 during propellant testing. Sound and overpressure levels did not exceed regulatory limits. There was no evidence of fragmentations as a result of the propellant ignition. Upon the ignition of the propellant, fire erupted and propellant grains were forced from the opening at the top of the FOSS and scattered around the APE 1995 for a radius of approximately 3 feet.

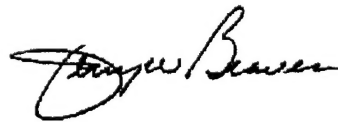
For the safety of the operator and future operations, a shield or separation distance should be provided between the operator, the APE 1995, and the remaining bulk propellant being tested. Other options would include remote operation in two areas. Since the unit is not 'explosion proofed', future use should be with extreme caution and only in a 'clean environment' with dust or explosive contaminants maintained at a minimum.

Prepared by:



JERRY W. PERTEET  
Electronic Engineer

Reviewed by:



JERRY W. BEAVER  
Chief, Validation Engineering Division



**U.S. ARMY DEFENSE AMMUNITION CENTER**  
VALIDATION ENGINEERING DIVISION  
MCALESTER, OK 74501-9053

**REPORT NO. 03-07**

**Ammunition Peculiar Equipment (APE) 1995, NIR Propellant Analyzer, to  
MIL-STD-398, "Military Standard Shields, Operational for Ammunition  
Operations, Criteria for Design of and Tests for Acceptance."**

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## **PART 1 – INTRODUCTION**

**A. BACKGROUND.** The U.S. Army Defense Ammunition Center (DAC), Validation Engineering Division (SJMAC-DEV), was tasked by DAC, Maintenance Engineering Division (SJMAC-DEM) to test the Ammunition Peculiar Equipment (APE) 1995, NIR Propellant Analyzer, to MIL-STD-398, "Military Standard Shields, Operational for Ammunition Operations, Criteria for Design of and Tests for Acceptance." The test was conducted with the APE 1995 fully loaded with M1 propellant and placed inside the FOSS 5000 Near Infrared Spectrometer. The ignition of this propellant was for test purposes only and not part of normal operations for testing the M1 propellant.

**B. AUTHORITY.** This test was conducted IAW mission responsibilities delegated by the U.S. Army Operations Support Command (OSC), Rock Island, IL. Reference is made to the following:

1. AR 740-1, 15 June 2001, Storage and Supply Activity Operation.
2. OSC-R, 10-23, Mission and Major Functions of U.S. Army Defense Ammunition Center (DAC) 21 Nov 2000.

**C. OBJECTIVE.** The objective of this test was to determine if the APE 1995 satisfied the test requirements of MIL-STD-398, "Military Standard Shields, Operational for Ammunition Operations, Criteria for Design of and Tests for Acceptance."

**D. CONCLUSION.** The APE 1995, as tested by ignition of the M1 propellant, provides operator protection in accordance with MIL-STD-398, "Military Standard Shields, Operational for Ammunition Operations, Criteria for Design of and Tests for Acceptance." The ignition of the M1 propellant in the APE 1995 was for test purposes only and not part of normal operations for testing the M1 propellant.

If the ignition of the M1 propellant occurs in the APE 1995, the fixture will be rendered unusable and shall be returned for refurbishing to SJMAC-DEM, Defense Ammunition Center, 1 C Tree Road, Building 35, McAlester, OK 74501-9053. The reason the APE 1995 must be refurbished in the event of an inadvertent ignition within the fixture is because of the flame and heat associated with the M1 propellant burning. Test pressure results indicated a maximum of 0.28050 psi with maximum sound pressure of +47 decibels and maximum temperature of 1593.52 degrees F. The high temperature and the 3 ft. radius of the burning propellant grains provided evidence that it would be dangerous for an operator to be close to the APE 1995 during propellant testing. Sound and overpressure levels did not exceed regulatory limits. There was no evidence of fragmentations as a result of the propellant ignition. Upon the ignition of the propellant, fire erupted and propellant grains were forced from the opening at the top of the FOSS and scattered around the APE 1995 for a radius of approximately 3 feet.

**E. RECOMMENDATIONS.** For the Safety of the operator and future operations, a shield or separation distance should be provided between the operator, the APE 1995, and the remaining bulk propellant being tested, as a minimum. Since the unit is not 'explosion proofed', future use should be with extreme caution and only in a 'clean environment' with dust or explosive contaminants maintained at a minimum.

## **PART 2 - ATTENDEES**

**DATE PERFORMED: 6 MAR 2003**

### **ATTENDEES**

### **MAILING ADDRESS**

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McAlester, OK 74501-9053

### **PART 3 - TEST EQUIPMENT**

#### **A. DATA ACQUISITION SYSTEM**

Manufacturer              National Instruments

#### **B. IMPULSE NOISE**

Manufacturer:              Quest

Model #                      M-28D

#### **C. OVERPRESSURE TRANSDUCER**

Manufacturer:              PCB Piezotronics

Model #                      137A23

Serial #                      3089

Serial #                      3090

#### **D. TEMPERATURE PROBES**

Manufacturer:              OMEGA

Part #                        TT-J-20-SLE

## **PART 4 – ENGINEERING TESTS PROCEDURES**

- A. **METHOD 101- BLAST OVERPRESSURE MEASUREMENT.**
- B. **METHOD 102- IMPULSE NOISE LEVEL MEASUREMENT.**
- C. **METHOD 201- FRAGMENT RETENTION TEST.**
- D. **METHOD 301- HEAT FLUX MEASUREMENT.**

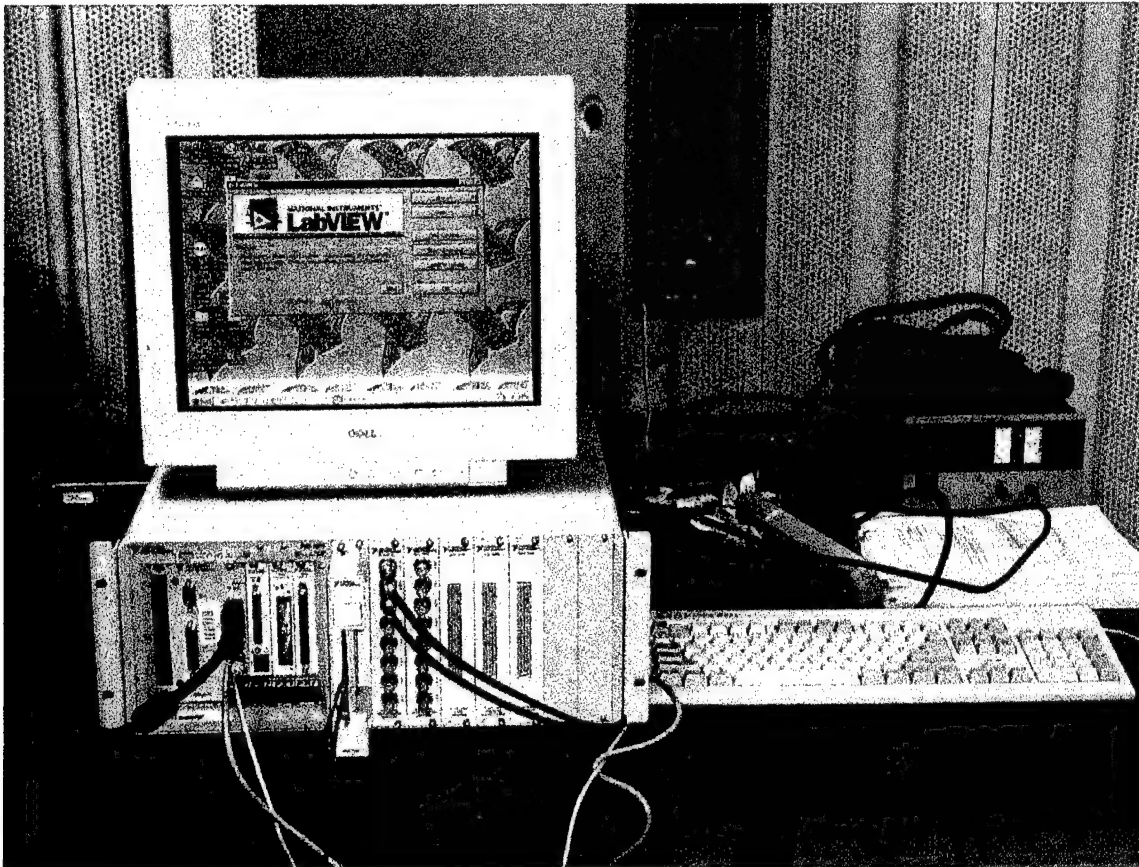
## **A. METHOD 101- BLAST OVERPRESSURE MEASUREMENT.**

**1. PURPOSE.** Measurement of blast overpressure was conducted to ensure that personnel are not exposed to peak positive incident overpressures greater than 2.3 psi when the operations shield is subjected to a Maximum Credible Incident (MCI). An acceptable alternative to measuring peak positive incident overpressure is to measure peak positive normal reflected overpressure. Personnel shall not be exposed to maximum positive normal reflected overpressure greater than 5.0 psi when the operational shield is subjected to an MCI. Peak positive normal reflected overpressure was measured during this testing.

**2. DESCRIPTION OF TEST.** An MCI was created with the ignition of the M1 propellant in the APE 1995. Blast pressure gages were used to measure blast overpressures.

**3. CRITERIA FOR PASSING TEST.** APE 1995 meets Method 101 criteria if the peak positive normal reflected overpressures are below 5.0 psi.

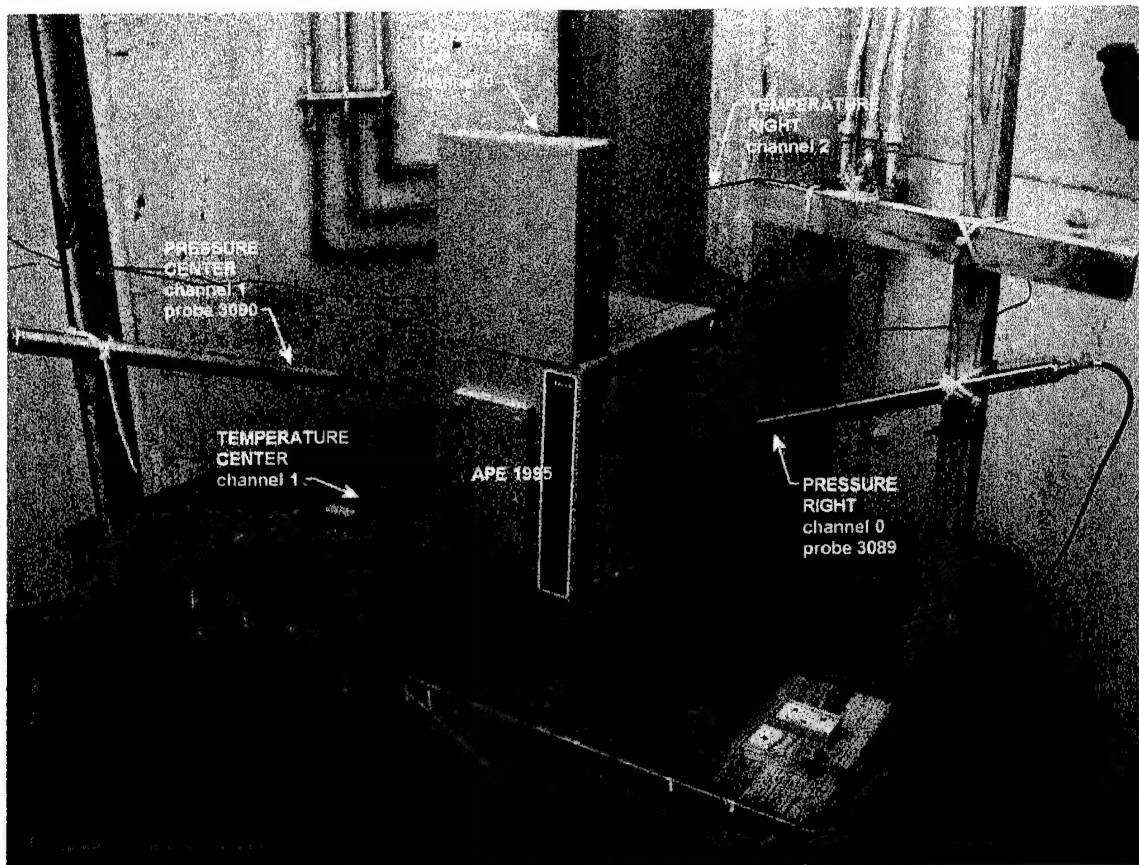
**4. INSTRUMENTATION.** 2 ea. PCB Free Field Blast Pressure Probe, Model 137A23, and National Instruments Data Acquisition System were used to collect data. The instrumentation was calibrated in accordance with current procedures in TB 43-180, Calibration Requirements for the Maintenance of Army Material.



**Photo 1: Setup of Data Acquisition system.**

**5. TEST PROCEDURES.** The APE 1995 was tested in a “U” shaped bay in an ammunition operation building located at McAlester Army Ammunition Plant. Overpressure readings were taken at the center of probable head location for the operator of the APE 1995 fixture. This location was directly in front and to the right side of the APE 1995 fixture approximately 60 inches above the floor.





**Photo 2: Setup of Blast Overpressure Monitor.**

## **B. METHOD 102- IMPULSE NOISE LEVEL MEASUREMENT.**

**1. PURPOSE.** Measurement of impulse noise level was conducted to ensure that personnel are not exposed to a sound pressure level greater than 140 decibels during operations. Noise levels greater than 140 decibels will require hearing protection as outlined in MIL-STD-1474D, "Department of Defense Design Criteria Standard, Noise Limits."

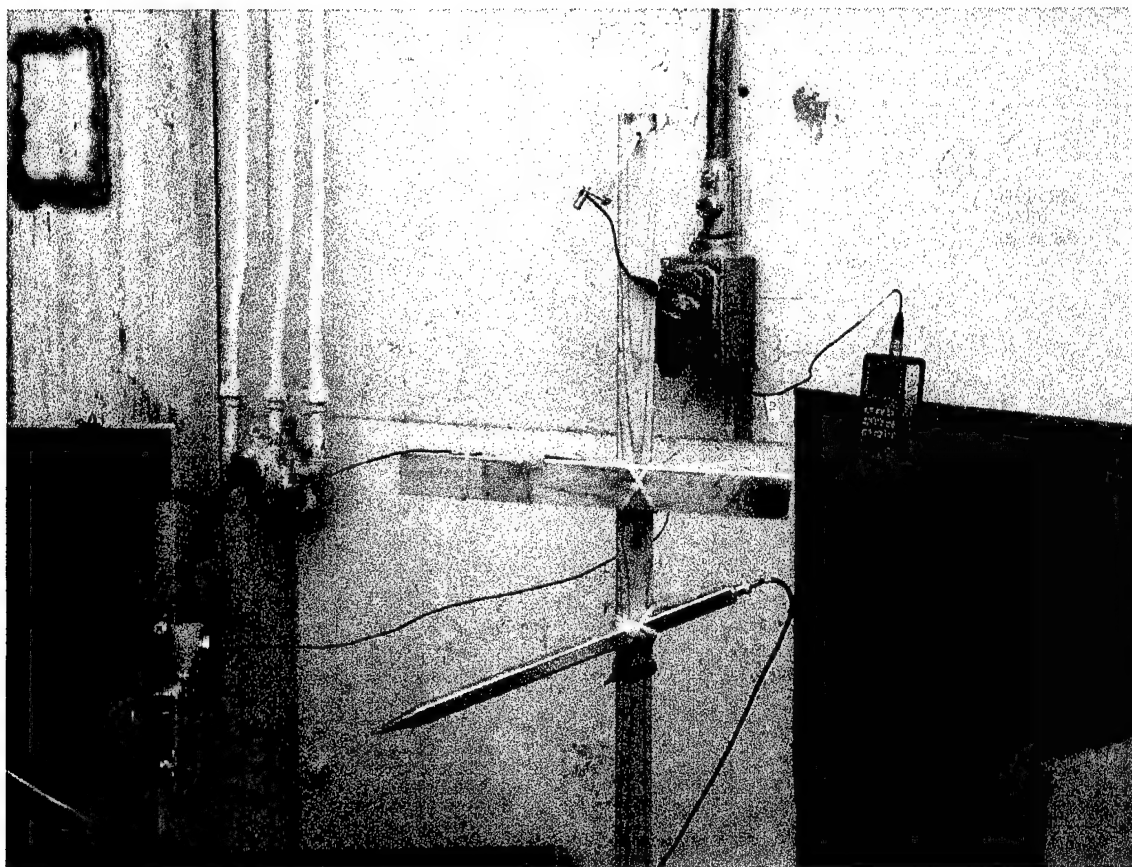
**2. DESCRIPTION OF TEST.** An MCI was created by ignition of the M1 propellant in the APE 1995. Sound level meters were used to measure impulse noise levels.

**3. CRITERIA FOR PASSING TEST.** APE 1995 meets Method 102 criteria if the impulse noise levels are fewer than 140 decibels. If the levels are greater than 140 decibels hearing protection will be required as outlined in MIL-STD-

1474D, "Department of Defense Design Criteria Standard, Noise Limits."

**4. INSTRUMENTATION.** Quest Model M-28D was used to collect noise data. The instrumentation was calibrated in accordance with current procedures in TB 43-180, "Calibration Requirements for the Maintenance of Army Material."

**5. TEST PROCEDURES.** The APE 1995 was tested in a "U" shaped bay in an ammunition operation building located at McAlester Army Ammunition Plant. Impulse noise level readings were taken at the probable location for the operator of the APE 1995 fixture. This location was left and to the right of the APE 1995 fixture approximately 75 inches above the floor.



**Photo 3: Setup of Impulse Noise Monitor.**

### **C. METHOD 201- FRAGMENT RETENTION TEST.**

1. **PURPOSE.** Fragment testing was conducted to verify that the APE 1995 will:

- a. Contain all fragmentation or direct fragmentation away from areas requiring protection.
- b. Prevent generation of secondary fragmentation within areas requiring protection.
- c. Prevent movement, overturning, or structural deflections that could result in personnel injury.

2. **DESCRIPTION OF TEST.** An MCI was created with the ignition of the M1 propellant in the APE 1995. A still picture camera and video camera were used to capture any fragmentation that occurs.

3. **CRITERIA FOR PASSING TEST.** APE 1995 meets Method 201 criteria if:

- (a) Containment of all fragmentation from areas requiring protection.
- (b) Prevent generation of secondary fragmentation within areas requiring protection.
- (c) Prevent movement, overturning, or structural deflections that could result in personnel injury.

4. **INSTRUMENTATION.** A digital still camera and analog video camera were used to capture images before, during, and after the functioning of the M1 propellant.

5. **TEST PROCEDURES.** The APE 1995 was tested in a "U" shaped bay in an ammunition operation building located at McAlester Army Ammunition Plant. The M1 propellant was ignited in the APE 1995. Pictures were taken before and after the ignition. Video recordings were made of the ignition.

**D. METHOD 301- HEAT FLUX MEASUREMENT.** The heat flux was measured in three locations (see Figure 1 below). The ambient temperature of the room was 68 degrees F. Due to the high heat recorded, the flux levels and fire would create a hazard for the operator.

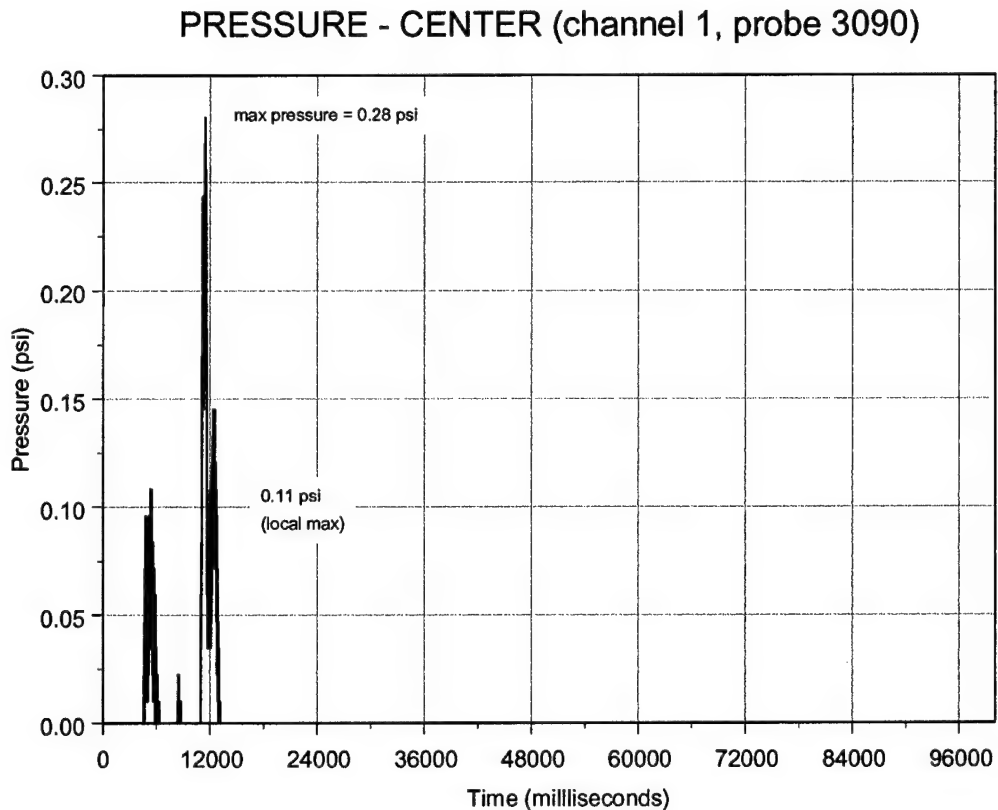
CHANNEL	LOCATION	TEMPERATURE
Top ch0	.5" above opening	1593.52 degrees F
Center ch1	10" from opening	76.72 degrees F
Right ch2	10" from opening	165.09 degrees F

**Figure 1**

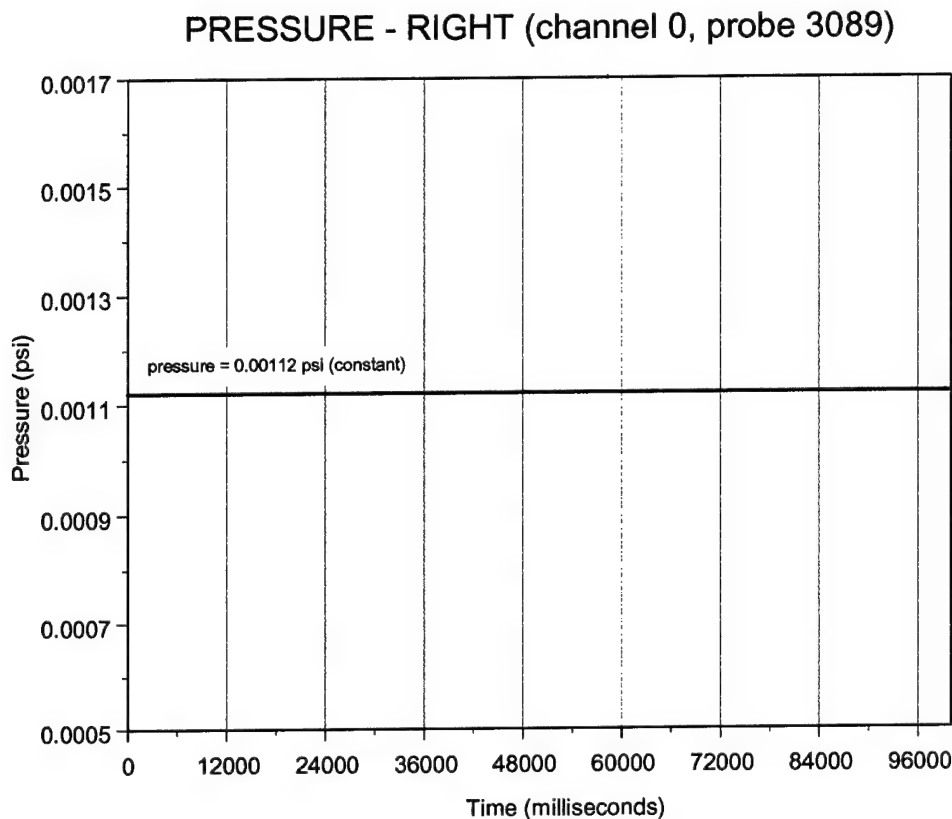
## **PART 5 - TEST RESULTS**

### **A. METHOD 101- BLAST OVERPRESSURE TEST RESULTS.**

Peak positive blast overpressures at the probable location of the operator were measured at approximately 0.2805 psi during the test. See Figures 2 and 3 on pages 5-1 through 5-2. Test results are satisfactory due to overpressures measured less than 5 psi.



**Figure 2**



**Figure 3**

**B. METHOD 102-IMPULSE NOISE LEVEL MEASUREMENT.**

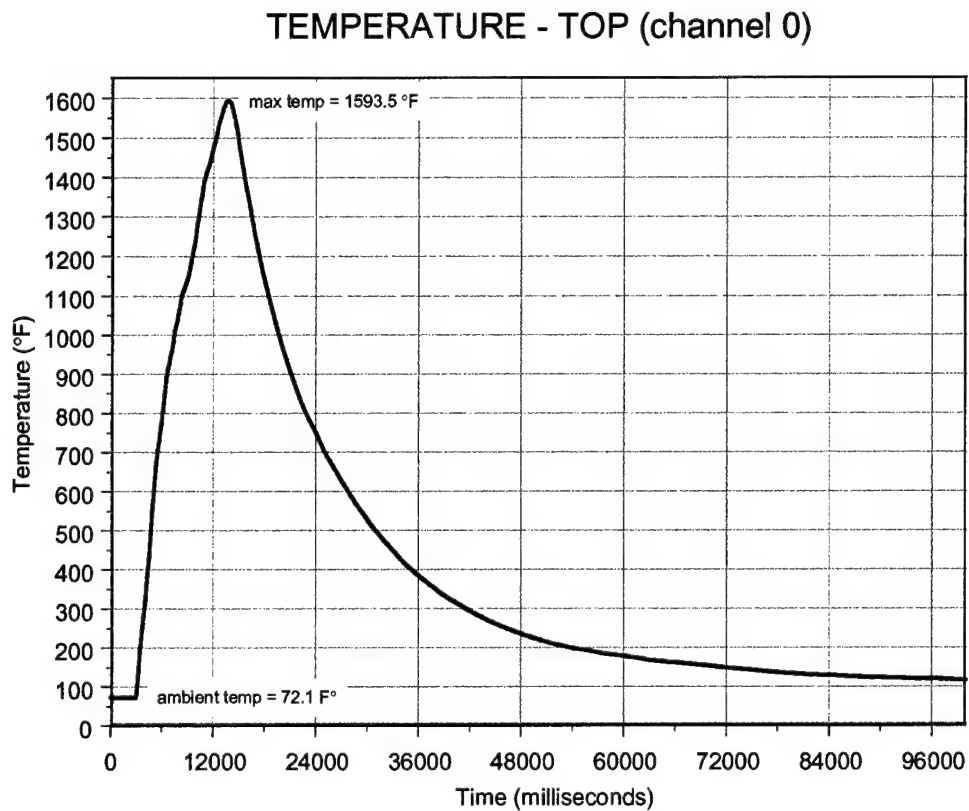
The peak impulse noise level was measured in two locations at +47 decibels right side and +33 decibels left side during ignition. In accordance with the Department of Defense Design Criteria Standard for Noise Limits, MIL-STD-1474D7, and the Department of Army Hearing Protection Pamphlet 40-501 no hearing protection is needed when operating this equipment.

**C. METHOD 201-FRAGMENT RETENTION TEST.**

The APE 1995, Fixture, M1 propellant was found to be structurally safe. There was no fragmentation of the metal or glass. There was displacement of burning propellant at a radius of three feet and there was no movement, overturning, or structural deflections of the APE 1995 Fixture, M1 propellant. See Photo 4-8.

#### **D. METHOD 301-HEAT FLUX MEASUREMENT.**

The expected high flux levels were evident in discoloration or burning within the APE 1995 fixture as seen in Photos 7 and 8. Figures 4 and 5 depict the temperatures during testing.



**Figure 4**

# TEMPERATURE - RIGHT (channel 2)

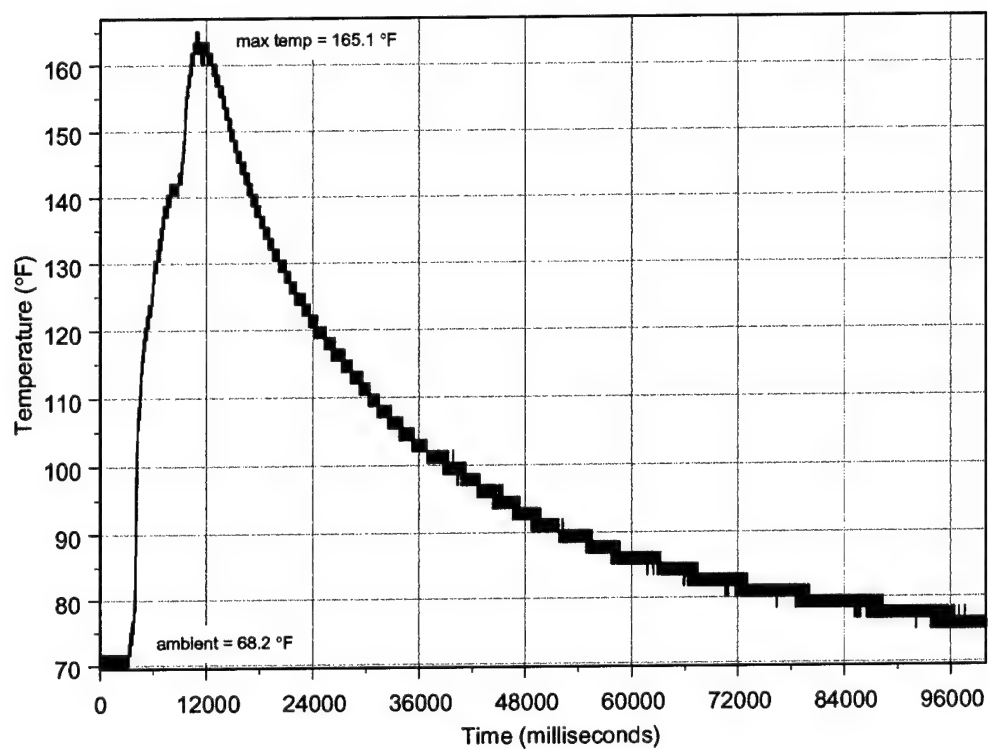


Figure 5



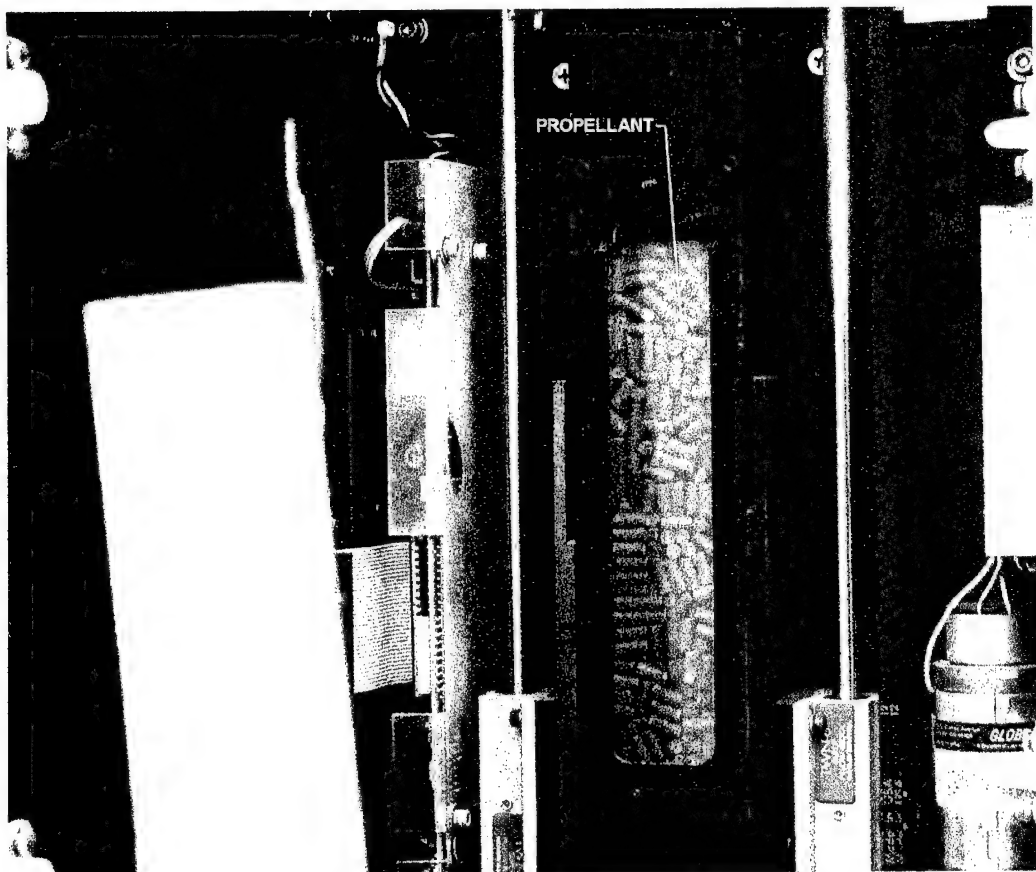


Photo 4: APE 1995 before ignition.

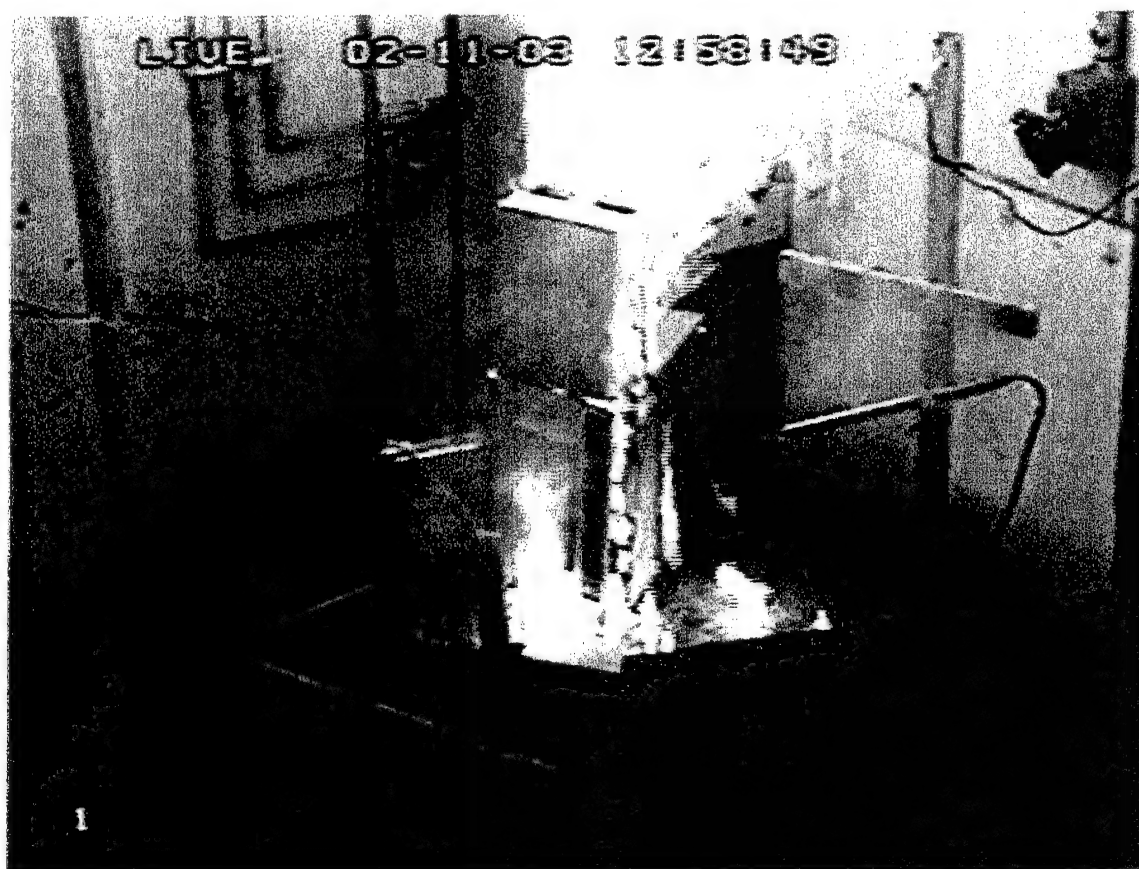
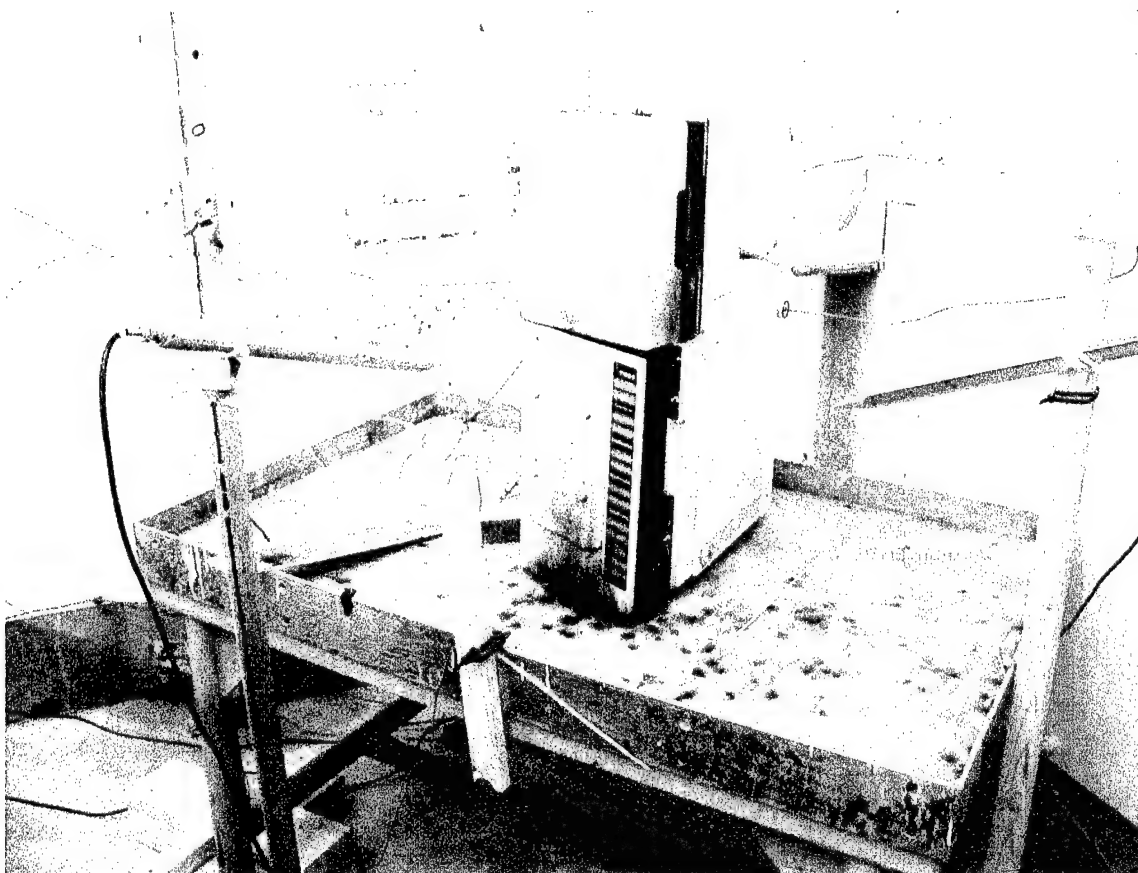


Photo 5: APE 1995 during ignition.



**Photo 6: APE 1995 after ignition.**

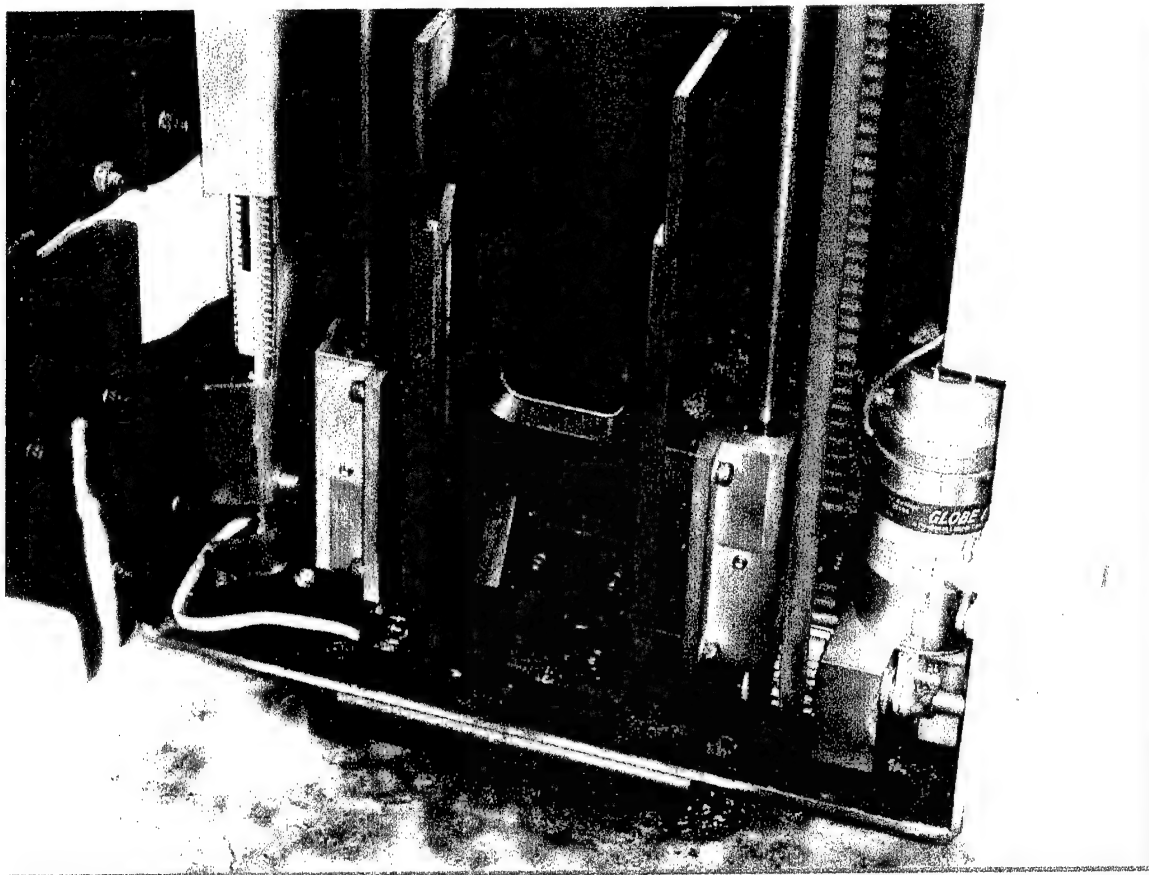
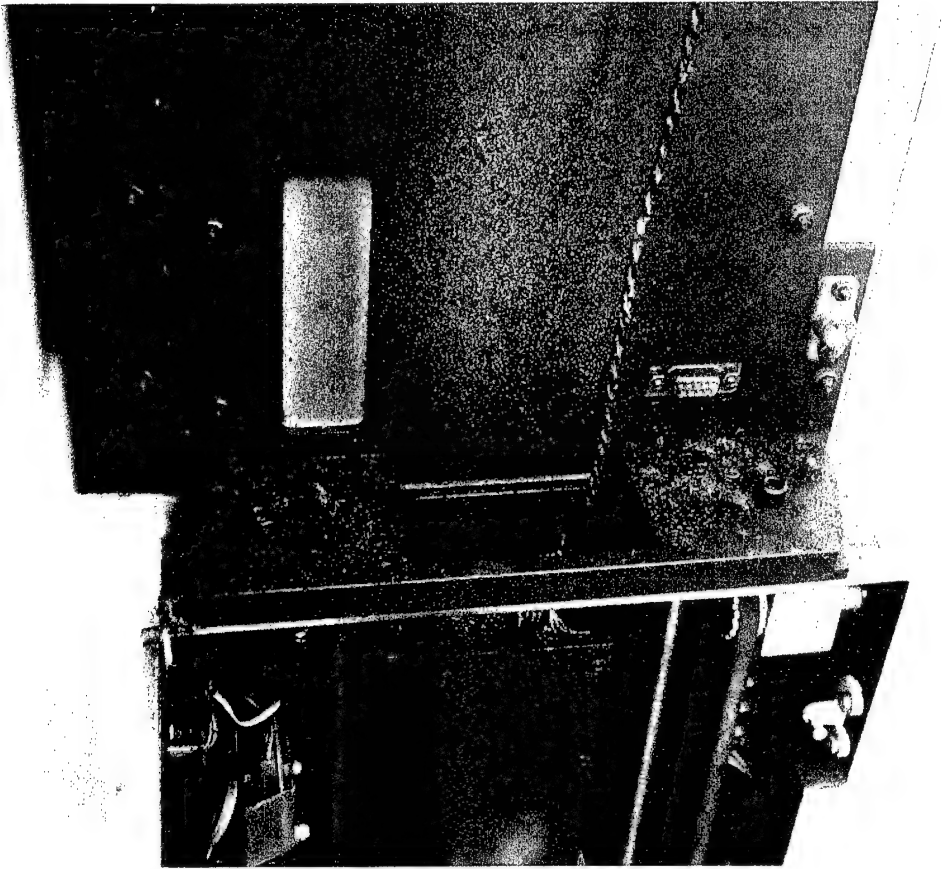


Photo 7: APE 1995 following ignition.



**Photo 8: APE 1995 following ignition.**

## **PART 6 - SOP**

1. DEFENSE AMMUNITION CENTER  
STANDING OPERATING PROCEDURE (SOP) FOR:

2. ITEM: a. Propellant  
b. 1320-DODIC Various  
c. Fire Symbol 1  
d. Hazard Class 1.3  
e. Chemical Hazard Symbol - None  
f. N/A

3. OPERATION: Engineering test of APE 1995 NIR  
4. ESTIMATED DAILY PRODUCTION RATE: N/A  
5. ORGANIZATION SYMBOL: SJMAC-DEM  
6. SOP NO. AC-M000-P-002 DATE 22, January, 2003

a. REV 1 DATE: 5 February 2003  
b. CHG DATE:

7. AUTHORITY: TM-9-1300-277  
DATE: Jun 88

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9. REVIEWED BY: Paul A. Cummins 5 Feb 03 TITLE: Test Engineer  
PAUL A. CUMMINS Date  
10. SUBMITTED BY: David V. Schardein 5 Feb 03 TITLE: Chief, Maintenance  
DAVID V. SCHARDEIN Date Engineering Division

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	<u>Darrell L. Elliott</u> DARRELL L. ELLIOTT	5 Feb 03	Director, Environmental Mgmt (MCAPP)
SAFETY	<u>Luther W. Winburn</u> LUTHER W. WINBURN	6 Feb 03	Chief, Safety Office (MCAAP)
SURVELANCE	<u>John A. Wallace</u> JOHN A. WALLACE	6 Feb 03	Chief, Ammunition Surveillance (MCAAP)

12. APPROVAL: DATE Feb 06, 2003

CHARLES P. STROO  
DIRECTOR  
Defense Ammunition Center

JYUJI D. HEWITT  
COL., OD  
Commanding

for Barbara Venhug  
J. D. Hewitt

1. DEFENSE AMMUNITION CENTER  
STANDING OPERATING PROCEDURE (SOP) FOR:

2. ITEM: a. Propellant

b. 1320-DODIC Various  
c. Fire Symbol 1

d. Hazard Class 1.3

e. Chemical Hazard Symbol - None  
f. N/A

3. OPERATION: Engineering test of APE 1995 NIR  
4. ESTIMATED DAILY PRODUCTION RATE: N/A  
5. ORGANIZATION SYMBOL: SJMAC-DEM  
6. SOP NO. AC-M000-P-002 DATE 22, January, 2003

a. REV DATE:  
b. CHG DATE:

7. AUTHORITY: TM-9-1300-277  
DATE: Jun 88

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28 Jan 03 Director, Environmental Mgmt  
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*Luther W. Winburn*  
LUTHER W. WINBURN

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DATE 29 Jan 2003

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*Jyuj D. Hewitt*



SOP NO. AC-M000-P-002 DATE: 22 Jan 03  
REV NO. 1 DATE: 04 Feb 03  
CHG NO. \_\_\_\_\_ DATE: \_\_\_\_\_

SJMAC-DEM (702-4c)

4 Feb 2003

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SOP NO. AC-M000-P-002 DATE: 22 Jan. 03  
REV NO. 1 DATE: 04 Feb 03  
CHG NO. \_\_\_\_\_ DATE: \_\_\_\_\_

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20	1				
21	1				
21	1				

SOP NO. AC-M000-P-002 DATE: 22 Jan. 03  
REV NO. 1 DATE: 04 Feb 03  
CHG NO. \_\_\_\_\_ DATE: \_\_\_\_\_

**TEST PLAN FOR  
APE 1995 NIR PROPELLANT ANALYZER  
GENERAL TEST DESCRIPTION**

A test on a salvage FOSS 5000 Near Infrared Spectrometer, which is the main working component of the APE 1995 NIR Propellant Analyzer, is to be conducted in Bldg 220 at the McAlester Army Ammunition Plant. Bldg 220 is the explosive test facility for the Defense Ammunition Center.

The purpose of this test is to examine the hazards of an inadvertent propellant initiation in the APE 1995. The hazard severity in this instance is assumed to be marginal. There would be minor damage to property or the environment. An injury of personnel would likely require first aid or minor treatment. The accident probability is unlikely. One can assume that an inadvertent propellant initiation will not occur, but it is not impossible.

This test will help us confirm these assumptions.

A propellant cell normally used in operation of the APE 1995 is to be fully loaded with M9 propellant and placed inside the salvage FOSS 5000. Operators from the demolition range will place an igniter squib inside the propellant. The doors of the unit will be closed. An operator will initiate the test from behind a blast wall. The following equipment will be used to monitor the test:

- a) Two closed circuit cameras- Visual Evidence
- b) Pressure Transducers- Blast Overpressure Measurement
- c) Temperature Thermocouples- Heat Flux Measurement
- d) Sound Level Meters- Impulse Noise Level Measurement

The above tests will be performed IAW Mil-Std-398. The results will be reported in a final report and submitted to the APE Program Office for review.

LEAD TEST ENGINEER STATEMENT

1. The Lead Test Engineer will sign this statement:
  - a. When first assigned as The Lead Test Engineer of the Operation.
  - b. When an approved formal change is made to the SOP.
  - c. At least once per quarter during continuing operations.
  - d. After absence from the job in excess of 15 consecutive workdays.
2. I have personally reviewed each of the operational steps of the SOP and have no question in my mind that the operation can be performed safely and efficiently, and in an environmentally acceptable manner. I have trained the operators in the details of their part of the operation and have instructed them to follow the SOP without deviation.
3. I have also advised personnel assigned to this operation of the Hazard Communication Program training requirement stipulated in Title 29, Code of Federal Regulations, Part 1910.1200h (29 CFR 1910-1200h). Specifically, they have been notified of the requirement of employee information and training, the operations in their work area where hazardous chemicals are present and the location and availability of the written Hazard Communication Program, including the Material Safety Data Sheets (MCAAP Safety Office). They have also been advised of:
  - a. Ways to detect presence or release of hazardous chemicals.
  - b. Physical and health hazards of chemicals in work area.
  - c. Protective measures involved with each hazardous chemical.
  - d. An explanation of the labeling system, and how the employee can obtain and use the appropriate hazard information.

LEAD ENG. ECH NAME/ SIGNATURE

DATE

\_\_\_\_\_  
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CHG NO. \_\_\_\_\_ DATE: \_\_\_\_\_

### OPERATOR'S STATEMENT

3. I have also been advised of the requirements of the Hazard Communications Program training requirement stipulated in Title 29, Code of Federal Regulations, Part 1910-1200h (29 CFR 1910-1200h). I have been advised of the hazardous chemicals used in this operation, the methods to detect presence or release of these chemicals, the physical and health hazards of these chemicals in the work area, protective measures involved with each hazardous chemical, an explanation of the labeling system and how I can obtain and use appropriate hazard information.

OPERATION NUMBER

SOP NO. AC-M000-P-002 DATE: 22 Jan. 03  
REV NO. 1 DATE: 04 Feb 03  
CHG NO. \_\_\_\_\_ DATE: \_\_\_\_\_

## OPERATOR'S STATEMENT (CONT'D)

2. (Cont'd)

[illegible]

## I. - GENERAL SAFETY REQUIREMENTS

1. The total explosive building limit of 1.3 items for Building 220, is 10 pounds. This includes explosives temporarily stored in trucks and rail cars parked adjacent to Building 220. The rail car is limited to 10 pounds NEW. Explosive limits of 1.3 items for bays in Building 220 is 10 pounds. NEW of 1.3 and 1.4 items will be limited to one full pallet load in each bay.
2. Explosive/hazardous material compatibility limitations will be adhered to.
3. Doors of building 220 have panic hardware installed and must never be bolted or locked when operations are being conducted. Posted personnel and explosive limits must not be exceeded at any time. Transient personnel must comply with the same safety requirements as operating personnel. In bays where conductive footwear is required, transient personnel such as production controller and other visitors to the operation are authorized to wear leg stats in place of conductive foot wear as long as their basic safety-toe footwear is of non-sparking construction IAW DA PAM 385-64, Chapter 6.
4. Employees will not tamper with any safety devices or protective equipment, including fire prevention or fire protection equipment.
5. Care will be taken to limit exposure of a minimum number of personnel, for a minimum time, to a minimum amount of hazardous material consistent with safe and efficient operations.
6. Personnel will be so located that operators will have an unobstructed path of travel to the nearest available exits.
7. Work locations will be maintained in a neat and orderly condition.
8. All hand tools shall be maintained in a good state of repair.
9. Operators lifting material will use proper, safe hand holds, avoid sharp objects, assume proper lifting position, and avoid twisting when lifting or carrying items. Adequate manpower or mechanical means will be employed when handling bulky or heavy items. Material handling equipment (MHE) with overhead cover will be used when handling material stored at elevated heights.
10. Explosives-loaded ammunition, packaged ammunition or bulk explosives shall not be handled roughly, thrown about, tumbled, dropped, or walked over other explosives or ammunition. Large ammunition items, packaged in DOT approved containers designed to permit dragging, rolling or towing may be so moved when necessary during handling for storage and transportation.
11. In the event of an electrical storm, action will be taken as outlined in AMC-R 385-100, Para 14-9 & OEM-260-SF. All personnel working in an bay or magazine containing exposed explosives and/or electro-explosive devices shall be evacuated. The Maintenance Engineering Division Chief will make final decision to evacuate personnel. The evacuated Building 220 shall have all doors closed and electrical switches turned off. The evacuated personnel shall be moved to an approved shelter at intraline distance.
12. The Test Engineer or his designated representative is responsible to report to the Safety Office, all injuries and accidents occurring during his/her shift. In the event of a fire or explosion, activate all installed fire extinguishing equipment and alarm systems. The person discovering the fire/explosion will notify the Test Engineer or his designated representative.

13. INSTRUCTIONS FOR HANDLING REJECTS CONTAINING EXPLOSIVES, DETECTED AS BEING ARMED OR PARTIALLY ARMED, WHICH COULD POSE A THREAT OF IMMINENT, UNINTENTIONAL INITIATION, CREATING A THREAT OR HAZARD TO OPERATIONS, PERSONNEL OR FACILITIES.

a. All personnel will report to the Test Engineer, or his designated representative, any item(s) suspected of being armed, partially armed or any item(s) suspected of posing an imminent hazard.

b. All personnel will be evacuated from the immediate area to a safe place.

c. The Test Engineer, or his designated representative, will immediately notify the Maintenance Engineering Chief of the hazardous material.

d. If, in Maintenance Engineering Chief's opinion, further movement of the item(s) would create an additional hazard, the item will not be moved. The Chief of Stockpile Management will take appropriate steps to dispose of the hazard and notify the appropriate EOD unit for assistance as required.

e. If, in the Maintenance Engineering Chief's opinion, the reject is hazardous, but its movement will not increase the hazard, the Maintenance Engineering Chief shall: clear all personnel from the immediate area, determine the safest temporary storage area to isolate the reject. The Maintenance Engineering Chief will designate the employee(s) to move the reject and will notify the Chief of Stockpile Management, if appropriate. The Chief of Stockpile Management will take steps as necessary to dispose of the hazard.

## II. - HAZARDOUS WASTE/CHEMICAL SAFETY REQUIREMENTS

1. All employees handling or storing material treated with Pentachlorophenol (PCP) "PENTA" should be aware of the guidance contained in U.S. Army Environmental Agency (USAEHA) publication, USAEHA TG No. 146.

a. The degree of hazard associated with "PENTA" treated packing materials cannot be determined by visual examination. There are no defining criteria to use in judging such items as "loose" or "excessive"; therefore, the following information is to provide final guidance on protective measures for handling "PENTA" treated wood. This guidance should be followed under the direction of a resident industrial hygienist who has evaluated the actual "PENTA" exposure in question.

b. Routes of Exposure:

(1) Inhalation:

(a) Vapor: The vapor pressure of PENTA is quite low. Therefore, inhalation of PENTA in the vapor state is unlikely. However, the potential for exposure is heightened in enclosed spaces during periods of hot weather when increased volatilization occurs.

(b) Dust: The airborne generation of PENTA dust/crystals is the major source of PENTA-related complaints. Crystals are dispersed into the air during transport and handling of the wood. This problem is magnified in an enclosed space, i.e., ammunition storage magazine or railroad box car. Dust, which may have settled on the floor, is often re-suspended into the air simply by walking into the magazine.

(c) Sawdust: Sawdust inhalation from PENTA-treated wood may produce the same acute irritation experienced after inhalation of PENTA crystals.

(2) Skin Absorption: PENTA readily permeates through the skin. Direct contact with crystalline PENTA or with tacky PENTA-treated wooden surfaces can result in entry of PENTA into the body.

(3) Ingestion: Ingestion of PENTA most often results from eating or smoking after contact with PENTA or PENTA-treated products.



c. Signs of Exposure:

(1) Under warm temperature or enclosed storage conditions, volatilized PENTA may cause respiratory distress and nose, throat, or eye irritation. PENTA is detectable at airborne concentrations of one-third of the recommended exposure level through its irritant effects. Therefore, PENTA is a material with good warning properties. A pungent PENTA odor or irritation of the mucous membranes (eye, nose or throat) are indications of potentially harmful airborne PENTA dust or vapor.

(2) The degree of safety, health or environmental hazards associated with PENTA-treated materials is difficult to estimate or quantify. Individuals with disorders to the cardiovascular system, respiratory system, liver, kidneys, or skin may develop problems at lower levels of exposure.

d. Risk to pregnant workers (Military/Civilian): Pregnant workers should not work in PENTA areas and should not handle PENTA or PENTA-treated materials. This is due to the teratogenic/fetotoxic hazards of the usual contaminants of PENTA.

e. Source of PENTA Exposures: When dealing with PENTA-treated materials, the airborne exposure potential to PENTA is greatest in ammunition storage magazines. Due to the enclosed undisturbed nature of these areas, volatilized PENTA will not be dispersed. Additionally, PENTA crystals on boxes can be dispersed into the air during pallet movements. Entering a magazine and moving ammunition boxes provides the greatest potential for airborne exposure.

f. Proper Ventilation: Ventilation provided, where practicable, should be enough to reduce airborne PENTA concentration to levels below the recommended standards. Use proper respiratory protection where adequate ventilation is not practical to reduce airborne PENTA levels below the standard. Consult your resident industrial hygienist for ventilation standards and proper respiratory protection.

g. Personal Protective Devices: The following personal protective devices are recommended for handling PENTA-treated materials:

(1) Gloves: The type of gloves worn is dependent upon the characteristics of the wood being handled.

(a) Wet or Tacky Wood: Nitrile rubber or polyvinyl chloride gloves.

Protective Gloves:

Gloves, Chemical and Oil Protection

Gauntlet I4", Size 9 8415-00-823-7455

Gloves, Chemical and Oil Protection

Gauntlet II", Size 7 8415-01-147-6263

Size 8 8415-01-157-9540

Size 9 8415-01-012-9294

Size 10 8415-01-013-7382

Size 11 8415-01-013-7384

(b) Properly Treated Wood: Leather-palmed gloves (NSN 8415-00-634-4658) offer proper skin protection. Perspiration buildup may allow PENTA to permeate through leather gloves. Therefore, wear only dry leather-palmed gloves.

(2) Coveralls:

(a) Wear only coveralls laundered on a routine basis (preferably daily).

(b) Don't take coveralls home, but leave at the work site.

(c) If coveralls are laundered at an installation/post laundry, advise laundry personnel to launder them separately from other clothing. This will reduce the possibility of cross-contamination.

(d) Do not launder severely contaminated clothing. Treat this clothing as a pesticide-related waste and dispose of accordingly.

(3) Chemical Goggles: Wear when handling wood with visible crystals of PENTA or when generating wood dust.

h. Personal Hygiene: Do not smoke, eat or drink in the work areas. Wash hands before eating, drinking, smoking or using toilet facilities. Wash all exposed areas of the body at the end of each workday.

i. Toxicity and Treatment: It is not always clear whether a toxic effect is due to PENTA itself or to an impurity (e.g., chlorinated dibenzofurans and dibenzodioxins). Thus, toxicity is more important than the cause.

j. PENTA may enter the body through inhalation, ingestion or dermal contact. Acute irritation of the eyes, nose and throat are noted with PENTA vapor or dust exposure. This may even occur at levels below the permissible exposure limit, especially in the unacclimated individual. Removal from exposure is the primary treatment for acute irritation. Improved ventilation and hygiene practices should prevent further occurrence.

k. If PENTA particles or solutions get in the eyes, flush the eyes with water for 15 minutes and obtain medical attention.

l. Skin irritation also can occur. Immediately wash contaminated skin with soap or mild detergent and water. Promptly change any PENTA contaminated clothing. Workers should shower and change to street clothes at the end of each work shift. Prohibit eating, smoking or drinking in PENTA work areas. Good hygiene practices and appropriate personal protective equipment should prevent the majority of routine exposure and toxicity problems.

m. Acute systemic intoxication may occur through any of the exposure routes but usually through skin absorption in hot weather. It is characterized by:

- (1) Weakness;
- (2) Dizziness;
- (3) Headache;
- (4) Nausea;
- (5) Vomiting;
- (6) Shortness of Breath;
- (7) Chest Pain;
- (8) Profuse Sweating;
- (9) Extremely High Body Temperature.

**This serious intoxication may be fatal and is a medical emergency. Remove affected individuals from exposure immediately.**

2. Disposal of wooden items: All serviceable pallets and ammunition boxes may be stored for reuse or if excesses, are turned in to DRMO. All unserviceable wooden items, wire-bound boxes, small skids and wood components are to be taken to the scrap lumberyard.

3. PQ-56 is a wood preservative with a low acute toxicity between aspirin and common table salt when supplied as a concentrate. Skin irritation is possible when PQ-56 is used in low concentrations. In order to avoid skin irritations, use gloves when handling wood products treated with PQ-56.

4. M-GARD W550, a fungicide used to treat wood, is not a hazardous chemical. In concentrated liquid form, it can cause severe irritation of the eyes and moderate irritation on the skin. The use of gloves when handling treated wood will help prevent skin irritations.

5. As a protective measure, personnel who may have come in contact with items containing lead should wash hands prior to eating, drinking, smoking or using toilet facilities and at end of shifts. This also applies to personnel that

utilize or may have come in contact with O.D. paint.

6. Material data sheets on hazardous materials are available in the Industrial Hygiene Office, Ext. 6495 or in the library of Building 569. Hazardous materials will be annotated with an asterisk (\*\*) in the list of Equipment, Tools, Gages and Supplies. Each individual working with these materials should be made aware of the potential hazards and precautions to be taken to avoid any harmful effects of the materials. If hazardous materials are used and are not identified in the SOP, prior approval shall be required from the environmental coordinator for identification of hazardous waste generation point location and handling procedures.

7. Lead wire seals removed from containers will be treated as recyclable hazardous waste and placed in an appropriate container marked for DRMO. Gloves will be used when handling any form of lead. All other hazardous material will be disposed of in properly marked containers.

8. Explosive contaminated water rags, and/or scrap explosives, i.e., floor sweepings, etc., shall be forwarded to the Explosive Burning Ground for disposal as required.

9. Hazardous waste, except explosives and explosive contaminated items, shall be containerized in DOT approved containers. Each container must have a hazardous waste label showing contents, proper shipping name, UN or NA number, EPA waste code, EPA facility identification number (OK6213822798) and date container is filled. Only one drum of a specific waste may be accumulated at a time. When these containers are full, they shall be transferred to the Hazardous Waste Storage Facility, DRMO, Building 669, within 3 days. SJMMC-LOO shall be notified of the transfer of the containers and the proper paperwork accomplished, to assure transfer of custody/responsibility/accountability. Explosives and explosive contaminated waste shall be taken to the Burning Ground for disposal.

10. The test engineer, or his designated hazardous waste handler, will coordinate with the Environmental Management office to assure the following criteria is met.

- a. Properly containerized.
- b. Properly labeled.
- c. Each container weighed.
- d. 1348-1 for each container (signed by SJMMC-EM).
- e. Material Safety Data Sheet (MSDS).
- f. Chemical analysis (good for one year).

11. For specific information regarding proper turn in procedures, refer to the Hazardous Waste Management Plan.

12. In the event of a spill, refer to McAAP Installation Spill Prevention Control and Countermeasure Plan/Installation Spill Contingency Plan (ISPCCP/ISCP) and notify SJMMC-EM, Ext. 6551.

13. All consumable, hazardous materials and hazardous wastes shall be stored under cover in accordance with the Storm Water Pollution Prevention Plan (SWP3) to prevent contamination, which will affect the water quality of storm water discharges associated with industrial activities.

### III. - FIRE PROTECTION REQUIREMENTS

1. Appropriate AMC fire symbol and/or chemical hazard symbol shall be displayed in such a manner as to be easily visible from all roads of approach.

2. Appropriate AMC Fire Symbols and/or chemical hazard symbols shall be displayed on vehicles used in transporting ammunition intradepot.
3. Fire fighting equipment will be readily accessible at all times.
4. All fires starting in the vicinity of ammunition or explosives shall be reported and fought immediately with all available means and without awaiting specific instructions; however, if the fire involves explosive materials or is supplying heat to it, or if the fire is so large that it cannot be extinguished with the equipment at hand, the personnel involved shall evacuate and seek safety.
5. Paint thinners, oily rags and other highly flammable materials will be kept in approved, closed receptacles.
6. Flammable liquid dispenser safety can and rubber gloves (NEOPRENE) are required for dispensing and handling of flammable liquids such as alcohol and acetone.

#### **IV. - EQUIPMENT SAFETY REQUIREMENTS**

1. Each MHE or vehicle operator will have in his/her possession a valid operator's permit for the particular piece of equipment to be operated.
2. Types E, EE, and EX rated battery-powered equipment are satisfactory for handling all classes of ammunition and explosives packed IAW Department of Transportation (DOT) regulations.
3. MHE and other lifting devices will have the load rating and date of next inspection marked on them. The load rating will not be exceeded and the equipment will not be used without a current inspection date.
4. MHE will not be used to lift or stow overhead without overhead guards on the MHE.
5. Equipment and the grounding system shall be tested for electrical resistance and continuity IAW DA PAM 385-64, Chapter 6. All exposed explosive or hazardous materials shall be removed prior to making the test. Test results will be recorded and accomplished by Operations Maintenance Branch, Electrical Section personnel.
6. All installed gages and equipment will be properly grounded IAW Chapter 6 of DA PAM 385-64 & AMC-R 385-100, Chapter 7.
7. Standard worktables will be equipped with guardrails to prevent ammunition from rolling off. Metal tables will be grounded.
8. Conveyors will be equipped with positive stops at both ends and electrically grounded.
9. Carts with projectiles or complete rounds will be equipped with ground strap.

#### **V. - PERSONAL PROTECTIVE EQUIPMENT**

1. Operating personnel shall wear approved safety apparel, including fire retardant coveralls, hair covering and foot protection, as required.
2. Operators will wear approved conductive, explosive-operation, steel-toe safety shoes unless otherwise specified herein.
3. Test conductive shoes on individuals daily in each area office building or designated area IAW **DA PAM 385-64, Chapter 6, Para 6-10d(1)**. Documentation of this testing shall be kept by supervisory personnel.
4. Personnel performing and/or in close proximity to steel banding operations will wear approved safety eye protection. Personnel handling metal banding will also wear leather or leather-palmed gloves. All other personnel,

including visitors, shall also be required to utilize appropriate eye protection devices meeting current American National Standard (ANSI 87.1).

5. Leather or leather-palmed gloves will be worn when handling wooden boxes, pallets or steel banding.
6. Respiratory protection must be readily available to all persons working on or in the work area of Chemical Group B Agent Munitions IAW DA PAM 385-64, Para 13-10g & AMC-R 385-100, Para 10-4.
7. Operations where dusts, vapors or gases are present should have an industrial hygienist evaluate the hazard to determine whether respirators are needed. Identify the appropriate type of respirator in the list of equipment for that operation.
8. All requests for respiratory protection shall be directed to the Industrial Hygiene Office, who will select, fit, procure and control the equipment.
9. Operators shall clean and sanitize his/her respirator daily.
10. Noise level reading will be taken to establish criteria for wearing of earplugs. When noise level is above 85 decibels, the area must be posted as "Hazardous to Hearing". Appropriate hearing protectors must be provided and personnel required to wear the devices when in areas of exposure.

#### **VI. - PROCEDURE SAFETY REQUIREMENTS**

1. Standing Operating Procedure (SOP), applicable portion, shall be conspicuously posted in rooms or bays involved in the operation. Supervisory personnel shall maintain copies of a complete SOP and be responsible for the enforcement of its provisions.
2. There will be no deviation or change from the approved SOP without prior approval of the Installation Commander or his Designated Representative.
3. All persons involved in the operations covered by this SOP will be cognizant of their respective duties in accordance with (IAW) AMC-R 385-100, Para 14-17.
4. Any unusual or abnormal condition noted which is not covered in this SOP shall be reported immediately to Test Engineer., or his designated representative.

# INDEX OF OPERATIONS

OPER NO.	BLDG NO. OR SITE	BAY NO.	TOTAL EXPL ALLOWED/BAY	DESCRIPTION OF OPERATION	PAGE NO.
1	569	1,2	425 lbs	Prepare Propellant	15
2	220	A, B, C	10 lbs	Receive and Depalletize Propellant	16
3	220	A, B, C,D	10 lbs	Heat Flux, Impulse Noise Level Test	18
4	220	A, B, C	10 lbs	Remove Demilitarized Scrap and secure test site at end of operation.	25

## K. SPECIAL REQUIREMENTS:

1. Operation 2 will precede operation 3.
2. The total explosive building limit of 1.3 items for Building 220, is 10 pounds. This includes explosives temporarily stored in trucks and rail cars parked adjacent to Building 220. The rail car is limited to 10 pounds NEW. Explosive limits of 1.3 items for bays in Building 220 is 10 pounds. NEW of 1.3 and 1.4 items will be limited to one full pallet load in each bay.
3. The Test Engineer or his designated representative will insure fire extinguishers are charged and readily accessible.

## REMARKS:

1. Purpose: This Standing Operating Procedure (SOP) is a prescribed procedure for testing the APE 1995 FOSSNIR.
2. SCOPE: This SOP is an applicable operating procedure for the Maintenance Engineering Division. The contents of this SOP is only to be used by experienced ammunition personnel.
3. This SOP utilizes information from a variety of other resource manuals and should be considered as a quick reference point. The reference material should be checked before using to assure it is valid. If the manual has been superseded, use the current edition.
4. The ammunition/explosive items are considered sensitive material as defined in DOD 5100.76-M and AR 190-II, therefore all appropriate security measures will be taken.
5. Lot integrity will be maintained.
6. Waivers, exemptions, and/or approved deviations: NONE
7. Any user of this SOP who has a suggestion for procedural improvements not included in the SOP should contact the SOP Coordinator, SJMMC-LOM-S and request that such suggestion be reviewed and considered for incorporation in this SOP.
8. Memorandum, SJMMC-EM, Subject: Waste Management Procedure for SOP No. AC-M000-P-002, shall be used by workshop personnel for disposal of waste.

**REFERENCES:**

AMC-R 385-100	AMC Safety Manual
DA PAM 385-64	Ammunition and Explosive Safety Standards.
AMC-R 700-107	Preparation of SOPs for Ammunition Operations.
MCAAP-R 385-8	MCAAP Safety Manual.
SB 755-1	Disposition of Used Ammunition Packing Material and Certain Specified Ammunition Components.
MIL-STD 129	Marking for Shipment and Storage.
AR 55-355	Military Traffic Management Regulation.
DOD 5100.76-M	Physical Security of Sensitive Conventional Arms, Ammunition, & Explosives.
AR 190-11	Physical Security of Arms, Ammunition and Explosives.
	Applicable AINs.
	Applicable Drawings.
	DOD Single Manager Suspense Manual.
TB 9-1300-385	Munitions Restricted or Suspended.
TO 11-A-1-1	Air Force Restriction Manual
TW024-AA-ORD-10	Navy Restriction Manual
DRXLS FOI 18-742-6	Inspection of Supplies and Equip--Ammo Surv System.
	DOD Consolidated Ammunition Catalog, Vol. 1, 2, and 3.
TB 43-0142	Safety Inspection and Testing of Lifting Devices.
DA PAM 738-750	The Army Maintenance Management System (TAMMS)
TM 9-1300-200	Ammunition General
TM 9-1300-214	Military Explosives.
TM 9-1300-250	Ammunition Maintenance.
TM 9-0001-28	Army Ammunition Data Sheets.
TM 9-1375-213-12	Operator and Organizational Maint Manual for Demolition Materials
TM 43-0001-36	Army Ammunition Data Sheets for Land Mines.
TO 11A20-10-7	Electric and Non-Electric Blasting Caps, Electric Squibs & Associated Dummy Items
	MCAAP Installation Spill Prevention Control and Countermeasure Plan/Installation Spill Contingency Plan.
	MCAAP Hazardous Waste Management Plan.
	Storm Water Pollution Prevention Plan.
	CFR 40 Part 262, Standards Applicable to Generators of Hazardous Waste
	CFR 49 Part 172, Hazardous Materials Tables and Hazardous Materials Communications.
	Memorandum, SJMMC-EM, Subject: Waste Management Procedure for SOP No. AC-M000-P-001.

## 10. Attachments:

None

## 11. Addendums:

Addendum I - Site Plan of Building 220.

## 12. Enclosures:

Enclosure I - Memorandum for The Establishment of Waste Management Procedures.  
 Enclosure II - Memorandum, SJMMC-EM, Subject: Waste Management Procedure for SOP No. (AC-M000-P-002), APE 1995 NIR PROPELLANT ANALYZER Bldg 220.  
 Enclosure III Hazard Analysis.

SOP NO. AC-M000-P-002 DATE: 22 Jan. 03  
REV NO. 1 DATE: 04 Feb 03  
CHG NO. \_\_\_\_\_ DATE: \_\_\_\_\_

A. STANDARD OPERATING PROCEDURE FOR:  
ENGINEERING TEST OF APE 1995 NIR  
DODICs: 1320-DODIC Various  
Hazard Class: 1.3  
Fire Symbol: 1

B. OPERATION NO. 1  
C. BAY NO. Bldg. 569 Bays 1,2  
D. SOP NO AC-M000-P-002 DATE 22 January 03  
E. REV DATE:  
F. CHG DATE:

G OPERATION: Prepare Propellant.

H. EXPLOSIVE LIMITS: 569 Bay Explosive limits for 1.1 items are 425 lbs. 569 Building Explosive Limits for 1.1 items is 10000 lbs. Assure Net Explosive Weight (NEW) Limits are not exceeded. . NEW of 1.3 and 1.4 items will be limited to one full pallet load in each bay.

I. PERSONNEL LIMITS: OPERATORS: 4 TRANSIENTS: 3

STEP  
NO. DESCRIPTION  
1. Prepare Propellant.

CAUTION  
ONLY THE MINIMUM AMOUNT OF  
PROPELLANT NECESSARY TO CONDUCT  
EXPLOSIVE TEST WILL BE PRE-PACKAGED.

NOTE  
Only certified ammunition personnel will prepare  
propellant samples.

SPECIFIC INSTRUCTION (SAFETY,  
OPERATIONAL, QUALITY CHARACTERISTICS)  
1.a (S)(O) Prepare Propellant in accordance with  
(IAW) SOP MC-000-R-310, section, "Selection,  
Preparation and shipment of Samples for ASRP."  
Propellant may be pre-packed in NIR Test Cell  
provided overall packaging meets the requirements of  
SOP MC-000-R-310.



SOP NO. AC-M000-P-002 DATE: 22 Jan. 03  
REV NO. 1 DATE: 04 Feb 03  
CHG NO. \_\_\_\_\_ DATE: \_\_\_\_\_

A. STANDARD OPERATING PROCEDURE FOR:

Engineering test of APE 1995 NIR

DODICs: 1320-DODIC Various

Hazard Class: 1.3

Fire Symbol: 1

B. OPERATION NO. 2

C. BAY NO. Bldg. 220 Bays A,B,C

D. SOP NO AC-M000-P-002 DATE 22 January 03

E. REV DATE:

F. CHG DATE:

G OPERATION: Receive and Depalletize Propellant.

H. EXPLOSIVE LIMITS: 220 Bay Explosive limits for 1.3 items are 10 lbs. 220 Building Explosive Limits for 1.4 items is 10 lbs.

Assure Net Explosive Weight (NEW) Limits are not exceeded.

I. PERSONNEL LIMITS: OPERATORS: 6

TRANSIENTS: 3

J. STEP

NO. DESCRIPTION

1. Receive Propellant from Storage.

SPECIFIC INSTRUCTION (SAFETY, OPERATIONAL, QUALITY CHARACTERISTICS)

1a. (S)(O) Test Engineer, or his designated representative, will assure proper fire hazard symbols are properly posted on building.

1b. (S)(O) Assure personnel and explosive limits are conspicuously posted.

1c. (S) Daily or prior to use, inspect hand tools, equipment and MHE for serviceability.

1d (S)(O) Transfer will be completed IAW SOP MC-000-L019 on army ammunition plant movement.

1e. (S) Move pallets of boxes with electric powered forklift or manual equipment when inside building.

1f. (S)(O) Remove fire symbols immediately upon completion of unloading.

1g. (O) Position unit load in appropriate storage bay.

1h. (S) Do not block exits.

1.i. (O)(S) The Test Engineer, or his designated representative, will post personnel at key entry points of test operation to prevent transients from entering test site. Personnel will be posted, in such a way as to provide the posted personnel equal or greater barrier and distance protection as those personnel located in the Instrumentation Bay; if equal protection can not be provided within building 220, personnel will be posted outside the entry points of building 220.

1.g. (O)(S) Posted entry point personnel will remain at entry point until relieved by Test Engineer, or his designated representative.

2. Identify Material received by Nomenclature, NSN and Lot Number. 2. (QC) Check nomenclature on samples to insure samples correspond with items requested on pull sheet or ATR (DA Form 4508).

3. Depalletize Propellant 3a. (S)(O) During debanding operations, operators will wear safety eye protection, face shield and leather or leather-palmed gloves. Personnel in the proximity of banding operations shall wear safety eyewear and face shield..

3b. (O) Cut and remove banding material and place scrap banding in appropriate container.

#### K. SPECIAL REQUIREMENTS:

1. Personnel handling material treated with Pentachlorophenol (PCP), PQ-56, and M-GARD W550, will refer to the General Safety Requirements.
2. When inspecting for NSNs correspondence with pull sheet, ensure that there is only one NSN per pallet. If more than one NSN is found, segregate and repalletize using only one NSN per pallet.
3. When unloading ammunition, carrier will have engine turned off, brakes set and wheels chocked.
4. When ammunition is present the Fire Department and Security Branch will be notified.
5. Assure the barricade tape is in place around the building and warning signs posted on all avenues of approach.

#### L. EQUIPMENT, TOOLS, GAGES AND SUPPLIES:

ITEM	QTY REQ'D	SPEC/DWG NO.	NSN
Safety Shoes, Conductive	1 pr/oper	MIL-S-3794E	
Face Shield	1 ea/oper	A-A-1770	4240-00-542-2048
Safety Glasses	1 pr/oper	ANSIZ87.1-1979	
Gloves, leather/leather-palmed	1 pr/oper	JJ-G-451	8415-00-634-4661
Ear plugs	As Req'd.	ANSI-STD-Z87.1-1979	
Coveralls, Fire Resistant	As Req'd.	MIL-C-14610	
Gloves, Neoprene	As Req'd.		8415-00-823-7455
Apron, Neoprene	As Req'd.		8415-00-222-8074
Electric Forklift, Type EE or EX	As Req'd.	MIL-T-21869	
Cutters, Steel Strapping	As Req'd.	GGG-C-00835B	
Conductive Work Table	As Req'd.		
Mat, Conductive	As Req'd.		5330-00-L00-5550
Fire Symbol	As Req'd.		
Barricade Tape	As Req'd.		
Test Warning Signs	As Req'd.		

A. STANDARD OPERATING PROCEDURE FOR:  
 ENGINEERING TEST of APE 1995 NIR  
 DODICs: 1320-DODIC Various  
 Hazard Class: 1.3  
 Fire Symbol: 1

B. OPERATION NO. 3  
 C. BAY NO. Bldg. 220 Bays A, B, C  
 D. SOP NO AC-M000-P-002 DATE 22, January, 03  
 E. REV DATE:  
 F. CHG DATE:

OPERATION 3.: Heat Flux, Impulse Noise Level Test.

EXPLOSIVE LIMITS: 220 Bay Explosive limits for 1.3 items is 10 lbs.  
 Assure Net Explosive Weight (NEW) Limits are not exceeded.

I. PERSONNEL LIMITS: OPERATORS: 6

TRANSIENTS: 4

STEP  
 NO. DESCRIPTION  
 1. Unpack Propellant

SPECIFIC INSTRUCTION (SAFETY,  
 OPERATIONAL, QUALITY CHARACTERISTICS)  
 1.a (S)(O) Cut and remove banding material and place  
 scrap banding in appropriate container.

**CAUTION:**  
**UNPACKED PROPELLANT AND PROPELLANT**  
**FILLED NIR SAMPLE CELL WILL ONLY BE**  
**HANDLED BY PERSONNEL WEARING**  
**CONDUCTIVE SOLED SAFETY SHOES IN A**  
**GROUNDWORK AREA.**

1.b. (S)(O) During debanding operations, operators  
 will wear safety eye protection, face shield and leather  
 or leather-palmed gloves. Personnel in the proximity  
 of banding operations shall wear safety eyewear and  
 face shield..

**THE BLASTING MACHINE , IT'S ACTIVATION**  
**DEVICE OR IT'S DC POWER CORD, OR THE**  
**FIRING PANEL JUNCTION BOX WILL BE**  
**SECURED AND THE KEY TO THE FIRING**  
**PANEL JUNCTION BOX, WILL BE IN THE**  
**POSSESSION OF THE PERSON RESPONSIBLE**  
**FOR CONNECTING THE WIRES OF THE**  
**IGNITERS TO THE FIRING CIRCUIT AT ALL**  
**TIMES.**

1.c. (O) Cut and remove banding material and place  
 scrap banding in appropriate container.

1.d. (S)(O) Using the proper lifting procedures,  
 propellant outer pack on inspection table.

1.e. (S)(O) Open outer container and transfer  
 propellant inner pack, from one outer pack to storage  
 bay table.

**NOTE:**  
**Properly trained personnel will perform test.**

2. Prepare FOSS NIR System for Test.

2. (S)(O) The FOSS NIR System and corresponding  
 test instruments will be set up in accordance with  
 MIL-STD-398, "Impulse Noise Level Measurement"  
 and "Heat Flux Measurement." Test preparation will be  
 directed by the Test Engineer, or his designated  
 representative.

3. Transfer Propellant to Test Bay.

3.a (S)(O) All personnel, except one qualified  
 demolition person and the Test Engineer, or his  
 representative, will return to the instrumentation bay.

3.b (S) All radio transmissions shall be a min. distance  
 of 500ft. of Test Bay.

3.c (O) Transfer propellant , in inner pack or in sample cell, to FOSSNIR test bay.

4. Place Propellant in FOSS NIR System Sample Cell.

4.a (S)(O) If propellant is not in FOSS NIR Sample Cell, ground FOSS NIR Sample Cell, with grounding strap to grounded table.

4.b (S)(O) Fill FOSS NIR System Sample Cell with propellant directly from conductive propellant inner pack.

4.c (O) If using NI-Crome wire set one propellant grain aside for initiation

5. Inspect FOSS NIR Sample Cell.

5. (Q)(S) Inspect FOSS NIR Sample Cell to insure that no propellant particles remain on outside of FOSS NIR Sample Cell.

6. Remove excess test propellant.

6.a (S)(O) If propellant is not in FOSS NIR Sample Cell and excess propellant remains in inner pack, seal inner pack.

6.b (S)(O) Transfer sealed inner pack to propellant storage bay.

6.c (O) Seal outer pack for transfer to demilitarization grounds.

7. Test Connecting Firing Wire for Continuity.

7.a (O) Unshunt wire and touch ends to galvanometer.

**NOTE:**

**1. The wire that will be connected to blasting machine ,or connected to the junction box, or variable DC power source (if using NI-Crome wire), and extending to the material prepared for burning are designated as the connecting firing wire.**

7.b (O) Read deflection; no deflection indicates shunt bars in firing panel are improperly grounded or a break in the firing wire, while only slight deflection indicates a point of high resistance. Repair or replace wires as required and retest.

**2. Variable DC power source will only be used with NI- Crome wire**

8a. If Using Igniter, or Squib, Test Igniter/Squib for Continuity.

8.a.a (O) Uncoil leg wires out to their full length and tape igniter to grounded table in Igniter Isolation Bay.

8.a.b (O) While in Test Bay, While holding wires with bare hands, for grounding purposes, unshunt leg wires of igniter and touch ends to galvanometer terminals.

8.a.c (O) Read deflection; no deflection indicates a bad igniter; replace igniter and retest. Place bad igniter into FOSSNIR Sample Cell.

8.b If using NI-Crome Wire, wrap wire around propellant.

8.b.a (O)(S) Touch grounded table to eliminate static electricity.

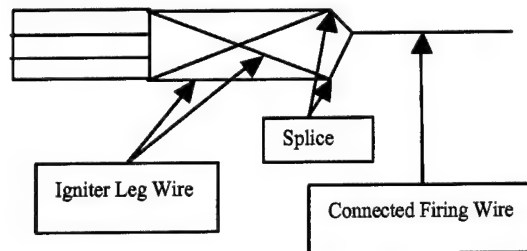
8.b.b wrap five coils around one propellant grain such

that the coils do not overlap each other.

9. Connect igniter Assembly to Firing Circuit.

9.a (S)(O) Ends of firing wire and igniter leg wires must be held together or touched to eliminate any static electricity that may have accumulated while opened for test.

9.b (O) Splice (twist) leg wires of igniter assembly in a parallel circuit to connecting firing wire as shown below.



10. Close FOSS NIR Sample Cell and Place Sample Cell in FOSS NIR System.

**CAUTION:**

**ONLY TRAINED DEMOLITION PERSONNEL WILL PLACE NIR SYSTEM SAMPLE CELL IN FOSS NIR SYSTEM WHILE BEING SUPERVISED BY TEST ENGINEER, OR HIS DESIGNATED REPRESENTATIVE.**

10.a (O)(S) Carefully insert igniter assembly and wire into FOSS NIR System Sample Cell, tape to secure igniter assembly inside sample cell.

10.b (S) Do not place any strain on leg wires of igniter assembly or on firing wire.

10.c (O)(S) Ensure splices are kept apart by applying tape to splices to prevent a short circuit.

10.d (O) Place FOSS NIR System Sample Cell in FOSS NIR System.

10.d (O)(S) Tape firing line out of the way of test instruments.

11. Instrumentation Positioned for Test.

11.a (O)(Q) On the Test Engineer's, or his designated representative's, notification, one Instrumentation Technician or Engineer will return to Test Bay and confirm instrumentation is properly placed. The Instrumentation Technician or Engineer will position sound, pressure and heat flux sensors.

11.b (O) Instrumentation Technician or Engineer will position APE 1072M3 cameras as needed.

12. Personnel Evacuate Test Bay.

12.b (O)(S) The Test Engineer, or his designated representative, will assure that all personnel, except personnel posted at test site entry points, are in Instrumentation Bay.

13. Personnel initiate Propellant loaded FOSSNIR System.

13.a (O)(S) Authorized demilitarization personnel will initiate Propellant loaded FOSSNIR System. In case of a misfire, personnel shall not return to the point of

**Note:**

**In the event of a misfire, personnel shall not return to the point of detonation for at least 30 minutes after which not more than two qualified personnel shall be permitted to examine the misfire.**

**In the event the Test Engineer, or his representatives observe a condition or event, which in their judgment creates an unsafe condition to personnel or equipment, the following operators, observe a condition or procedures will be reviewed and followed.**

14. Inspect FOSS NIR System.

deflagration for at least 30 minutes after which not more than two qualified personnel shall be permitted to examine the misfire. In the event the Test Engineer, or his representatives or operators, observe a condition or event which in their judgment creates an unsafe condition to personnel or equipment the following procedures will be reviewed and followed as found in Special Requirements 4.

Personnel shall not return to point of deflagration for at least 30 minutes. **Under no circumstance will the 30 minute waiting period be ignored.**

14.a (Q)(S)(O) Test Engineer , or his designated representative, and appropriate personnel will inspect FOSS NIR System.  
All Personnel will wear gloves while handling FOSS NIR System.

14.b Place all demilitarized scrap in designated demili scrap container.

14.c Damp mop all unburned propellant on Test Bay floor and place contaminated mop head in demili scrap container..

K. SPECIAL REQUIREMENTS:

1. When ammunition is present the Fire Department and Security Branch will be notified.
2. Assure the barricade tape is in place around the building and warning signs posted on all avenues of approach.
3. Assure personnel monitor key entry points to test site.
4. If a condition, situation, or circumstance, is regarded by the Test Engineer, or his designated representative, as being unsafe then the Test Engineering Technician will assure the safety of the test site and personnel, seal off the test site until an acceptable plan of action is determined, and notify the Maintenance Engineering Division Chief.
5. Test Engineer, or his designated representative, will insure all radio transmissions are secured except in cases of emergency. Emergency transmissions shall be a minimum distance of 500 feet from continuity test bay.
6. All personnel working with unpacked electric initiators will wear conductive shoes and verify conductivity at the continuity tester prior to starting operation.
7. The blasting machine, its activation device or the keys for the firing panel shall, at all times, remain in the possession of the person responsible for connecting the Propellant ignition squib to the firing line.
8. Everyone in building 220 will wear earplugs.

L. EQUIPMENT, TOOLS, GAGES AND SUPPLIES:

ITEM	QTY REQ'D	SPEC/DWG NO.	NSN
Safety Shoes, Conductive	1 pr/oper	MIL-S-3794E	
Safety Glasses or Goggles	1 pr/oper	ANSIZ87.1-1979	
Gloves, leather/leather-palmed	1 pr/oper	JJ-G-451	8415-00-634-4661
Ear plugs	As Req'd.	ANSI-STD-Z87.1-1979	
Coveralls, Fire Resistant	As Req'd.	MIL-C-14610	
Gloves, powder cotton	As Req'd.	MIL-G-2874	
Knife, electricians, pocket	As Req'd.		5110-00-162-2205
Pliers, Electricians, 8" lg.	As Req'd.		5120-00-239-8251
Conductive Work Table	As Req'd.		
Mat, Conductive	As Req'd.		5330-00-L00-5550
Fire Symbol	As Req'd.		
Barricade Tape	As Req'd.		
Test Warning Signs	As Req'd.		
APE 1953 Conductive	1 ea		
Floor and Conductive Shoe			
Test Equipment			
APE 1072M3 Closed	2 ea		
Circuit Television System			
for Hazardous			
Enviroments.			
Overpressure Sensors	As Req'd.		
Demil Scrap Container	As Req'd.		
Demolition Kit	As Req'd.		
Battery, silver chloride,	2. ea		6135-00-128-1632
dry-cell, BA-245/u			
Galvanometer, circuit tester	As Req'd.	MIL-G-38763	6625-00-539-8444
Tape, pressure sensitive,	As Req'd.	PPP-T-66	8135-00-266-6715
adhesive			

SOP NO. AC-M000-P-002 DATE: 22 Jan. 03  
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Tote Box, 1/4" alum., for igniters	1 Each	MCAAP C-892	
Variable DC power supply, 0-25 volts, 0-20 amps	1 Each	Commercial	
Igniter (M1 Squib)	As Req'd		1377-00-219-8567
(S67 Squib)			1377-00-038-5182
(M117 Igniter)			1340-00-038-9145
(M20A1 Igniter)			1340-00-862-3228
NW 100 Ni-Crome Wire (.0228")		Commercial	



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 CHG NO. \_\_\_\_\_ DATE: \_\_\_\_\_

# OPERATIONS FORMAT

A. STANDARD OPERATING PROCEDURE FOR: B. OPERATION NO. 4  
 Engineering test of APE 1995 NIR C. BAY NO. Bldg. 220 Bays A, B, C  
 DODICs: 1320-DODIC Various D. SOP NO AC-M000-P-002 DATE 22 January 03  
 Hazard Class: 1.3 E. REV DATE:  
 Fire Symbol: 1 F. CHG DATE:

## G OPERATION Remove Demilitarized Scrap and secure test site at end of operation

H. EXPLOSIVE LIMITS: 220 Bay Explosive limits for 1.3 items is 10 lbs. Assure Net Explosive Weight (NEW) Limits are not exceeded.

I. PERSONNEL LIMITS: OPERATORS: 6 TRANSIENTS: 3

STEP NO. DESCRIPTION	SPECIFIC INSTRUCTION (SAFETY, OPERATIONAL, QUALITY CHARACTERISTICS)
1. Prepare demil scrap container transfer.	1.a (O) Transfer will be completed IAW SOP MC-000-L019 on army ammunition plant movement.  1.b (S)(O) Place hazardous waste sticker on each side of container.  1.c (O) Remove designated demil. Scrap containers.
2. Identify material Received by Nomenclature, NSN, and Lot Number.	2. (Q)(O) DA Form 4508 (Ammunition Transfer Record) to indicate quantity of ammunition items, by lot number, that were destroyed by test.
3. Palletize demil. scrap.	3.a (QC)(O) Position outer container onto pallets and secure with steel banding.  3.b (S) Countermeasure: During banding operations, operators will wear safety eye protection, face shield and leather or leather-palmed gloves. Personnel in the proximity of the banding operation will wear safety eye protection and face shield.
4. Place scrap into temporary storage until removed by pull crew.	4.a (O) Move pallet or boxes with an electric-powered forklift to holding bays pending transfer.  4.b (O) demil scrap will not be stored with ammunition.  4.c (O) Solid Scrap contaminated with propellant residue will be sent to the demilitarization burn grounds. Liquids, contaminated with propellant will be sent to the pink water waste treatment plant.

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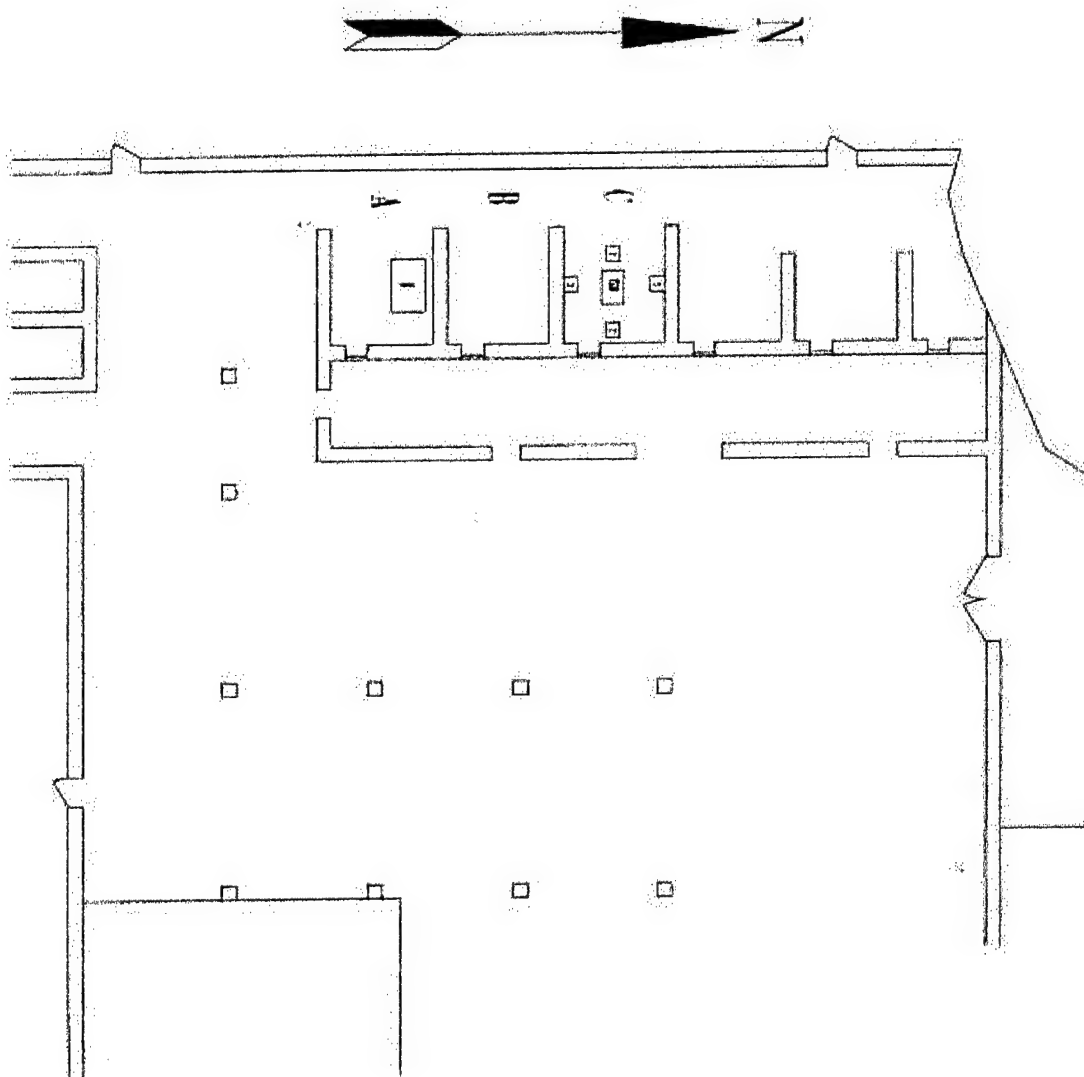
K. SPECIAL REQUIREMENTS:

L. EQUIPMENT, TOOLS, GAGES AND SUPPLIES:

ITEM	QTY REQ'D	SPEC/DWG NO.	NSN
Safety Shoes	1 pr/oper	MIL-S-3794E	
Face Shield	1 ea/oper	A-A-1770	4240-00-542-2048
Safety Glasses	1 pr/oper	ANSIZ87.1-1979	
Gloves, leather/leather-palmed	1 pr/oper	JJ-G-451	8415-00-634-4661
Coveralls, Fire Resistant	As Req'd.	MIL-C-14610	
Gloves, Neoprene	As Req'd.		8415-00-823-7455
Apron, Neoprene	As Req'd.		8415-00-222-8074
Electric Forklift, Type EE or EX	As Req'd.	MIL-T-21869	
Cutters, Steel Strapping Banding	As Req'd.	GGG-C-00835B	
Hand Crimpers	As Req'd.		
Hand Banding Tool	As Req'd.		
Hammer	As Req'd.		5120-00-243-2959
Masking Tape	As Req'd.	UU-T-00106	7510-00-266-6710
Tape, Pressure-Sensitive Type III or VI	As Req'd.	PP-T-60D	
Plier's Lineman, 6"	As Req'd.		5120-00-239-8554
Side Cutters	As Req'd.		5120-00-239-8253
Pry Bar	As Req'd.		5120-00-293-2384
Seals, Lead	As Req'd.		
Salee Closure Tool	As Req'd.		5120-00-319-5434
Demil Scrap Container	As Req'd		
Hazardous Waste Label	As Req'd		
Pallet 4' X 4'	As Req'd		

Addendum I

1. Data Acquisition System
2. Pressure Transducer
3. Noise Levels



SOP NO. AC-M000-P-002 DATE: 22 Jan. 03  
REV NO. 1 DATE: 04 Feb 03  
CHG NO. \_\_\_\_\_ DATE: \_\_\_\_\_

Encl I

MEMORANDUM FOR SJMMC-EM

SUBJECT: Request for Waste Management Information for AC-M000-P-002,  
Engineering Test of FOSSNIR Propellant Analyzer.

1. Reference SOP AC-M000-P-002, Engineering Test of FOSSNIR Propellant Analyzer.
2. A list of waste generated, enclosure 1, and copy of the Consolidated Consumable Supplies, enclosure 2, are attached for your information.
3. Request you furnish disposition of waste from this operation.

2 Encl  
as stated

Evan M. Peters  
Mechanical Engineering Technician

SOP NO. AC-M000-P-002 DATE: 22 Jan. 03  
REV NO. 1 DATE: 04 Feb 03  
CHG NO. \_\_\_\_\_ DATE: \_\_\_\_\_  
Encl I

SOP AC-M000-P-002

January, 22, 2003  
ENCL1

BLDG. 220

OPERATION	ITEM
1.	Steel Strapping, Barricade Tape
2.	Steel Strapping
3.	Fired igniter Assembly, Demil Scrap Container, Lead Seals, Cotton Cloth Contaminated with Explosive Residue from ignited squib and propellant residue , Barricade Tape, Pallet, Nomex Gloves, Leather Gloves, Flame Retardant Coveralls, Demil Scrap Container, Mop contaminated with explosive residue from ignited squib and propellant residue.
4.	Steel Strapping,

SOP NO. AC-M000-P-002 DATE: 22 Jan. 03  
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Encl I

SOP AC-M000-P-002

22 January, 2003  
 ENCL2

**CONSOLIDATED SUPPLIES LIST**

ITEM	QTY REQ'D	SPEC/DWG NO.	NSN
Safety Shoes, Conductive	1 pr/oper	MIL-S-3794E	
Face Shield	1 ea/oper	A-A-1770	4240-00-542-2048
Safety Glasses	1 pr/oper	ANSIZ87.1-1979	
Gloves, leather/leather- palmed	1 pr/oper	JJ-G-451	8415-00-634-4661
Ear plugs	As Req'd.	ANSI-STD-Z87.1-1979	
Coveralls, Fire Resistant	As Req'd.	MIL-C-14610	
Gloves, Neoprene	As Req'd.		8415-00-823-7455
Apron, Neoprene	As Req'd.		8415-00-222-8074
Electric Forklift, Type EE or EX	As Req'd.	MIL-T-21869	
Cutters, Steel	As Req'd.	GGG-C-00835B	
Strapping			
Mat, Conductive	As Req'd.		5330-00-L00-5550
Fire Symbol	As Req'd.		
Barricade Tape	As Req'd.		
Test Warning Signs	As Req'd.		
APE 1953M2	1 ea		
Conductive Floor and Conductive Shoe Test Equipment			
APE 1072M3 Closed Circuit Television System for Hazardous Enviroments.	2 ea		
Overpressure Sensors	As Req'd.		
Demil Scrap Container	As Req'd		
Demolition Kit	As Req'd		
Cotton Cloth	As Req'd.		
Cotton Mop	As Req'd		
Banding	As Req'd.		
Hand Crimpers	As Req'd.		
Hand Banding Tool	As Req'd.		
Scissors	As Req'd.		
Work Table, grounded	As Req'd.		
Hammer	As Req'd.		5120-00-243-2959

SOP NO. AC-M000-P-002 DATE: 22 Jan. 03

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Encl I

Masking Tape	As Req'd.	UU-T-00106	7510-00-266-6710
Tape, Pressure-Sensitive Type III or VI	As Req'd.	PP-T-60D	
Screwdriver	As Req'd.		5120-00-293-1608
Plier's Lineman, 6"	As Req'd.		5120-00-239-8554
Side Cutters	As Req'd.		5120-00-239-8253
Pry Bar	As Req'd.		5120-00-293-2384
Staple Gun	As Req'd.		5120-00-889-1796
Seals, Lead	As Req'd.		
Salee Closure Tool	As Req'd.		5120-00-319-5434
Hazardous Waste Label	As Req'd		
Pallet 4' X 4'	As Req'd		
Safety Shoes	1 pr/oper	MIL-S-3794E	

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CHG NO. \_\_\_\_\_ DATE: \_\_\_\_\_

Encl I

SJMMC-EM

27 January 2003

MEMORANDUM FOR SJMAC-DEM (Evan Peters)

SUBJECT: Waste Management Procedures for **SOP # (AC-MOOO-P-002), APE 1995 NIR PROPELLANT ANALYZER Bldg 220**

1. Reference memorandum, SJMAC-DEM, 23 January 2003, subject: Request for Waste Management Procedures.
2. The following information is provided to assure proper disposal of waste generated during production run.

**WASTE**

Banding steel, seals, car

Cardboard, Labels, Tags,  
marker felt tip, paper,  
masking tape, gloves,  
bamicade tape, ear plugs  
(Non-explosive contaminated)

Lead Seals

Fired igniter assembly, ignited squibb,  
Items contaminated with explosives,  
Gloves, rags, mop heads etc.

Pallets reuseable "P" and Non-"P"  
Treated (Keep Segregated)

Pallets unserviceable "P" and Non "P" treated  
(Keep Segregated)

**DISPOSAL PROCEDURE**

DRMO (steel dumpster)

Landfill(paper dumpster)  
Remove from building  
at end of each shift

DRMO (separate container

for lead, recycle)  
Place in container, Affix H/W  
label, band, palletize. Fill out  
1348-1 complete with nomen  
clature (describe contents) ,  
type of explosive. Amount  
in lbs, Job Order number.  
(Send to MCAAP Buming  
Ground for Disposal)

Return to Outside Storage

Pittsburg Co Landfill (SJMMC-LO  
to transport)



SJMMC-EM

SUBJECT: Waste Management Procedures for SOP # (AC-MO00-P-002), APE 1995 NIR  
**PROPELLANT ANALYZER BLDG 220**

Wirebound boxes "P" treated  
(Keep Segregated)

Pittsburg Co. Landfill  
(SOSMC-LO will transport)

Wirebound boxes Non "P" treated  
Keep Segregated

Pittsburg Co. Landfill  
(SOSMC-LO will transport)

Aerosol Cans

Outside Storage  
(Aerosol Can Disposal)

Note #1: Chemical analysis (toxicity characteristic leaching procedure (TCLP) must be performed. Sample will be turned into the SOSMC-EM Office showing job, SOP and Building Number. Copy of analysis will be furnished for use in turn-in.

Note #2: Chemical analyses which are required for disposal are required only once per year per waste stream. However, if a change to the process or materials used occurs which involves a known hazardous material, this creates another waste stream and a new chemical analysis is required.

Note #3: A copy of the chemical analysis must accompany the DD Form 1348-1 turn-in document. Waste will not be accepted without this analysis.

Note #4: All unused portions of materials will be used for other jobs if possible. Do not turn in as scrap if reusable.

Note #5: For specific instruction regarding the turn in of waste, refer to MCAAP's Hazardous Waste Management Plan.

Note #6: Certain items destined for landfill such as paper, cardboard, plastic, etc may be recyclable. For specific instructions regarding our recycling program contact SJMMC-CAR, ext 7309.

Note #7: All waste for turn in to DRMO must be in DOT approved Drums/container. Drums must be secured with 5/8 inch bolts and rings with threads inserted downward (below top of container for stacking purposes). All waste must have no more than 3 drums per pallet and secured with steel banding. Drum exteriors must be clean and free of any waste residue. **Waste which does not meet all the above criteria will not be accepted for turn-in.**

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Encl II

3. This Waste Management Procedure supersedes all other Waste Management Procedures for this SOP.

4. The POC for this action is Mr. Larry Burnett, SJMMC-EM, ext 6553.

A handwritten signature in black ink, appearing to read "Darrell Elliot".

DARRELL ELLIOT, Director  
Environmental Management Office

SOP NO. AC-M000-P-002 DATE: 22 Jan. 03

REV NO. 1 DATE: 04 Feb 03

CHG NO. \_\_\_\_\_ DATE: \_\_\_\_\_

Encl III

Hazard Analysis

INDEX OF OPERATIONS

<u>OPER NO.</u>	<u>BLDG NO. OR SITE</u>	<u>BAY NO.</u>	<u>TOTAL EXPL ALLOWED/BAY</u>	<u>DESCRIPTION OF OPERATION</u>	<u>PAGE NO.</u>
1	569	1,2	425	Prepare Propellant	2
2	220	A, B, C	425	Receive and Depalletize Propellant	3
3	220	A, B, C,D	425	Heat Flux, Impulse Noise Level Test	7
4	220	A,B,C	425	Remove Demilitarized Scrap and secure test site at end of operation.	15

K. SPECIAL REQUIREMENTS:

3. Operation 2 will proceed operation 3.
4. The total explosive building limit of 1.3 items for Building 220, is 10 pounds. This includes explosives temporarily stored in trucks and rail cars parked adjacent to Building 220. The rail car is limited to 10 pounds NEW. Explosive limits of 1.3 items for bays in Building 220 is 10 pounds. NEW of 1.3 and 1.4 items will be limited to one full pallet load in each bay.

SOP NO. AC-M000-P-002 DATE: 22 Jan. 03  
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CHG NO. \_\_\_\_\_ DATE: \_\_\_\_\_  
Encl III

OPERATION 1. : Prepare Propellant.

STEP NO.	DESCRIPTION
	Prepare Propellant.

SPECIFIC INSTRUCTION (SAFETY,  
OPERATIONAL, QUALITY CHARACTERISTICS)  
Condition: Prepare Propellant.

(1) Hazard: Propellant improperly prepared for test,  
resulting in personnel injury or damage to equipment.

(2) RAC: III/C

(3) Countermeasures: Quantity of propellant to be  
prepared will be determined by Test Engineer.  
Propellant will be bagged as if it is a 1-pound sample  
in accordance with SOP MC-0000-R-310, section,  
"Selection, Preparation and Shipment of Samples for  
ASRP."

(4) RAC: IV/E

(1) Hazard: Inexperienced personnel injure themselves  
or damage equipment.

(2) RAC: III/C

(3) Countermeasures: Only certified ammunition  
personnel will prepare propellant samples.

(4) RAC: IV/E

OPERATION 2. : Receive and Depalletize Propellant.

STEP NO.	DESCRIPTION	SPECIFIC INSTRUCTION (SAFETY, OPERATIONAL, QUALITY CHARACTERISTICS)
1.	Receive propellant from storage.	<p>Condition: Receive propellant from storage.</p> <p>(1) Hazard: Fire initiated during operation            (2) RAC: III/C            (3) Countermeasures:                a. Test Engineering Technician will assure proper fire hazard symbols are properly posted on building.                b. Assure personnel and explosive limits are conspicuously posted.            (4) RAC: III/D</p> <p>(1) Hazard: Propellant transferred in an unsafe manner causing injury and or death.            (2) RAC: I/C            (3) Countermeasures: Transfer will be completed IAW SOP MC-000L019 on army ammunition plant movement.            (4) RAC: III/D</p> <p>(1) Hazard: Broken or unserviceable tool causes minor injury.            (2) RAC: III/C            (3) Countermeasures: Daily or prior to use, inspect hand tools, equipment and MHE for serviceability.            (4) RAC: IV/E</p> <p>Condition: Propellant moved to ammunition bay by forklift.</p> <p>(1) Hazard: Fumes from gasoline/diesel forklift causes CO poisoning.            (2) RAC: III/C            (3) Countermeasures: Move pallets of boxes with electric powered forklift or manual equipment when inside building.            (4) RAC: III/E</p> <p>(1) Hazard: Fire symbols not removed from vehicle and fire initiated. Fire fighting hindered.            (2) RAC: II/D            (3) Countermeasures: Remove fire symbols immediately upon completion of unloading.            (4) RAC: III/E</p> <p>(1) Hazard: Propellant damaged/initiated due to exposure to environment.            (2) RAC: II/A            (3) Countermeasures: Position unit load in appropriate</p>

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bay.

(4) RAC: II/E

(1) Hazard: Fire initiated, exits are blocked personnel trapped in building and die.

(2) RAC: 1/C

(3) Countermeasures: Do not block exits.

(4) RAC: II/E

2. Identify Propellant received by Nomenclature, NSN and Lot Number.

Condition: Propellant accepted.

(1) Hazard: Propellant, that is unsafe to handle, is received instead of proper propellant causing injury or death.

(2) RAC: 1/C

(3) Countermeasures: Check nomenclature on propellant to insure propellant corresponds with that requested on pull sheet or ATR (DA Form 4508).

(4) RAC: III/D

3. Depalletize Propellant.

Condition. Propellant depalletized.

(1) Hazard: Wood splinters, sharp objects, breaking banding injure personnel.

(2) RAC: II/C

(3) Countermeasures: During debanding operations, operators will wear safety eye protection, face shield and leather or leather-palmed gloves. Personnel in the proximity of banding operations shall wear safety eyewear and face shield.

(4) RAC: IV/D

(1) Hazard: Loose banding injures personnel.

(2) RAC: III/C

(3) Countermeasures: Cut and remove banding material and place scrap banding in appropriate container.

(4) RAC: IV/D

#### K. SPECIAL REQUIREMENTS:

1. Personnel handling material treated with Pentachlorophenol (PCP), PQ-56, and M-GARD W550, will refer to the General Safety Requirements.

6. When inspecting for NSNs correspondence with pull sheet, ensure that there is only one NSN per pallet. If more than one NSN is found, segregate and repalletize using only one NSN per pallet.

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7. When unloading ammunition, carrier will have engine turned off, brakes set and wheels chocked.
8. When ammunition is present the Fire Department and Security Branch will be notified.
9. Assure the barricade tape is in place around the building and warning signs posted on all avenues of approach.

L. EQUIPMENT, TOOLS, GAGES AND SUPPLIES:

ITEM	QTY REQ'D	SPEC/DWG NO.	NSN
Safety Shoes, Conductive	1 pr/oper	MIL-S-3794E	
*Face Shield	1 ea/oper	A-A-1770	4240-00-542-2048
Safety Glasses	1 pr/oper	ANSIZ87.1-1979	
Gloves, leather/leather-palmed	1 pr/oper	JJ-G-451	8415-00-634-4661
Ear plugs	As Req'd.	ANSI-STD-Z87.1-1979	
Coveralls, Fire Resistant	As Req'd.	MIL-C-14610	
Gloves, Neoprene	As Req'd.		8415-00-823-7455
Apron, Neoprene	As Req'd.		8415-00-222-8074
Electric Forklift, Type EE or EX	As Req'd.	MIL-T-21869	
Cutters, Steel Strapping	As Req'd.	GGG-C-00835B	
Conveyor	As Req'd.	MIL-C-11218	
APE 1953, Equipment	As Req'd.		
Conductive Floor and Conductive Shoe Test. Mat, Conductive	As Req'd.		5330-00-L00-5550

OPERATION 3. : Heat Flux, Impulse Noise Level Test.

STEP NO.	DESCRIPTION
1.	Unpack Propellant
	<p>SPECIFIC INSTRUCTION (SAFETY, OPERATIONAL, QUALITY CHARACTERISTICS)</p> <p>Condition: Cut and remove banding material and place scrap banding in appropriate container.</p> <p>(1) Hazard: Wood splinters, sharp objects, breaking banding injure personnel.</p> <p>(2) RAC: II/E</p> <p>(3) Countermeasures: During debanding operations, operators will wear safety eye protection, face shield and leather or leather-palmed gloves. Personnel in the proximity of banding operations shall wear safety eyewear and face shield.</p> <p>(4) RAC: IV/E</p> <p>(1) Hazard: Loose banding injures personnel.</p> <p>(2) RAC: III/C</p> <p>(3) Countermeasures: Cut and remove banding material and place scrap banding in appropriate container.</p> <p>(4) RAC: IV/E</p> <p>(1) Hazard: Personnel unaware of test in building enter test site and are injured.</p> <p>(2) RAC: II/C</p> <p>(3) Place barrier tape around test site. Post personnel at key test site entry points</p> <p>(4) RAC: II/E</p> <p>Condition: Place propellant outer pack on table in storage bay.</p> <p>(1) Hazard: Manual lifting causes back injuries.</p> <p>(2) RAC: III/C</p> <p>(3) Countermeasures: Using the proper lifting procedures, place propellant outer pack on storage bay table.</p> <p>(4) RAC: IV/E</p> <p>Condition: Open outer container and transfer propellant in inner most pack, from outer pack, to storage bay table.</p> <p>(1) Hazard: propellant initiated by extraneous, static electricity causing death or injury to operator.</p> <p>(2) RAC: I/C</p> <p>(3) Countermeasures: unpacked propellant will only be handled by personnel wearing conductive soled safety shoes in a grounded work area. If propellant outer pack is metal, grounding straps will be connected between outer pack and</p>



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grounded table. Propellant will remain in its inner pack during transfer and packing.

Tables and work areas will be conductive and properly grounded.

(4) RAC: IV/E

2. Prepare FOSS NIR System for Test.

Condition: The FOSS NIR System and corresponding test instruments will be set up in accordance with MIL-STD-398, "Impulse Noise Level Measurement" and "Heat Flux Measurement." Test preparation will be directed by the Test Engineer.

3. Transfer propellant to test bay.

Condition: Transfer propellant, to Test Bay.

1) Hazard: propellant initiated by extraneous, static electricity causing death or injury to operator.

(2) RAC: I/C

(3) Countermeasures: unpacked propellant will only be handled by personnel wearing conductive soled safety shoes in a grounded work area. Propellant will remain in its inner pack during transfer and packing.

Tables and work areas will be conductive and properly grounded.

4. Place propellant in FOSS NIR System Sample Cell.

Condition: Place propellant in FOSS NIR System Sample Cell.

(1) Hazard: Unnecessary personnel in test bay resulting in inadvertent initiation of propellant or damage to equipment or incorrect placement of sensors.

(2) RAC: I/C

(3) Countermeasures: All personnel, except the test engineer and two certified, demolition personnel, will evacuate to the instrumentation bay.

(4) RAC: IV/D.

(1) Hazard: Propellant initiated by static electricity.

(2) RAC: I/C

(3) Countermeasures: A grounding strap will be connected between the propellant inner pack and Sample Cell before propellant is placed in Sample Cell. The Sample Cell will be filled directly from the conductive propellant inner pack.

(4) RAC: IV/D.

(1) Hazard: Propellant initiated by being pinched between Sample Cell and Sample Cell Lid

(2) RAC: I/C

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- (3) Countermeasures: Operators will insure there is no propellant in area were Sample Cell Lid fits onto Sample Cell before Sample Cell Lid is fixed to Sample Cell.
- (4) RAC: IV/D

5. Remove excess test propellant.

- Condition: Excess propellant is transferred to Unpacking Bay and placed in outer pack.
- (1) Hazard: propellant initiated by extraneous, static electricity causing death or injury to operator.
  - (2) RAC: I/C
  - (3) Countermeasures: unpacked propellant will only be handled by personnel wearing conductive soled safety shoes in a grounded work area. If propellant outer pack is metal, grounding straps will be connected between outer pack and grounded table. Propellant will remain in its sealed inner pack during transfer and packing. Tables and work areas will be conductive and properly grounded.
  - (4) RAC: IV/E

6. Transfer igniters to Test Bay

- Condition: Transfer igniters to Test Bay.
- (1) Hazard: Firing circuit activated prior to personnel leaving Test Bay cause death or injury to personnel still in Test Bay.
  - (2) RAC: I/C
  - (3) Countermeasures: The Test Engineer will assure firing panel is locked and key for firing panel is in his possession.
  - (4) RAC: IV/E
- 
- (1) Hazard: Igniters initiate explosive material during transfer.
  - (2) RAC: I/C
  - (3) Countermeasures: Igniters will not be transported with explosive material.
  - (4) RAC: IV/E

6. Inspect firing circuit before operation.

Condition: Test firing circuit for continuity and stray current using Galvanometer, circuit tester.

(1) Hazard: Inexperienced personnel injury themselves or damage equipment.

(2) RAC: III/C

(3) Countermeasures: Only certified qualified demolition personnel will handle, inspect and function, firing devices and circuits, used to initiate the igniter assembly.

(4) RAC: IV/E

(1) Hazard: Ignition assembly initiates as a result of radio emissions killing personnel.

(2) RAC: I/C

(3) Countermeasures: Test Engineer will insure all radio transmissions are secured except in cases of emergency. Emergency transmissions shall be a minimum distance of 500 feet from Test Bay.

(4) RAC: IV/E

7. Test igniter for continuity.

Condition: Uncoil leg wires out to their full length and place igniter in a designated test bay, behind a barricade, or in a cap post.

(1) Hazard: Igniter tested in Bay where propellant is present, igniter initiates propellant causing death or injury to personnel and damage to equipment.

(2) RAC: I/C

(3) Countermeasures: Designated igniter test bay will not be the same bay used to store propellant or conduct tests.

(4) RAC: IV/E

Condition: While holding firing wire, unshunt leg wires of igniter and touch ends to galvanometer terminals.

(1) Hazard: Igniter assembly initiates, as a result of static electricity buildup between operator and igniter, killing personnel.

(2) RAC: I/C

(3) Countermeasure: Operator will unshunt Igniter with bare hands.

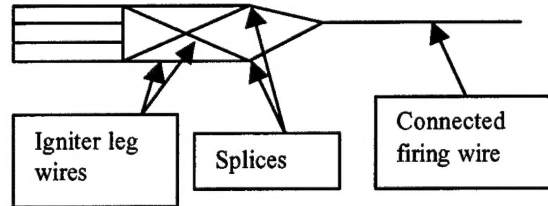
(4) RAC: IV/E

Condition: Read deflection; no deflection indicates a bad igniter; replace igniter and re-test. Place bad

igniters into Sample Cell.

7. Connect igniter assembly to firing circuit.

Condition: Splice (twist) leg wires of igniter in a parallel circuit to connecting firing wire as shown below.



- (1) Hazard static electricity accumulates while circuit is open for test. Igniter initiates due to accumulated static electricity. Causing death or injury to personnel.
- (2) RAC I/C
- (3) Hold or touch ends of firing wire and igniter to eliminate any static electricity that may have accumulated while open for test.

RAC IV/E

7. Close FOSS NIR System Sample Cell and place Sample Cell in FOSS NIR System.

Condition: Carefully insert igniter and wire into FOSS NIR System Sample Cell, tape to secure squib inside sample cell.

- (1) Hazard: Strain placed on leg of wires of igniter causing short circuit.
- (2) RAC III/B
- (3) Countermeasure: Operators insure unnecessary strain is not placed on igniter wires.
- (4) RAC IV/E

- (1) Hazard: Splices touch creating short circuit.
- (2) RAC III/B
- (3) Countermeasure: Splices will be taped apart.
- (4) RAC IV/E

Condition. Place FOSS NIR System Sample Cell in FOSS NIR System.

- (1) Hazard: Untrained personnel initiate propellant while placing FOSS NIR System Sample Cell in FOSS NIR System.
- (2) RAC I/C
- (3) Only trained demolition personnel will place FOSS NIR System Sample Cell in FOSS NIR System while being supervised by Test Engineer.
- (4) RAC I/E

8. Instrumentation positioned for test.

Condition: Instrumentation personnel return to Test Bay, position sound, pressure and heat flux sensors.

- (1) Hazard: Instrumentation personnel trip on firing

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line creating a short circuit.

- (2) RAC III/B
- (3) Countermeasure: Firing circuit will be taped out of instrumentation work area.
- (4) RAC IV/E
  
- (1) Hazard: Firing circuit activated prior to personnel leaving Test Bay cause death or injury to personnel still in Test Bay.
- (2) RAC I/C
- (3) Countermeasures: The Test Engineer will assure firing panel is locked and key for firing panel is in his possession.
- (4) RAC: IV/E

Condition: Position APE 1072M3 cameras.

9. Personnel evacuate test bay.

Condition: Move to instrument monitoring bay.

- (1) Hazard: Person(s) remain in unsafe area and are injured when test is performed.
- (2) RAC: II/C
- (3) Countermeasures: Test Engineer will insure all personnel are present in instrumentation bay before proceeding with operation.

10. Personnel initiate igniter Assembly

Condition: Authorized demilitarization personnel will set off the igniter assembly.

- (1) Hazard: Personnel suffer hearing loss due to test initiation.
- (2) RAC: II/B
- (3) Ear plugs will be worn by everyone in building 220.
- (1) Hazard: igniter hang-fires, injuring personnel who have prematurely entered test bay.
- (2) RAC: II/C
- (3) Countermeasures: In case of a misfire, personnel shall not return to the point of deflagration for at least 30 minutes after which not more than two qualified personnel shall be permitted to examine the misfire. In the event the Test Engineer, or his representatives or operators, observe a condition or event which in their judgment creates an unsafe condition to personnel or equipment the following procedures will be reviewed and followed as found in Special Requirements 3. Personnel shall not return to point of deflagration for at least 30 minutes. **Under no circumstance will the 30 minute waiting period be ignored.**
- (4) RAC: IV/E

10. Inspect FOSS NIR System.

Condition: Test Engineer and appropriate personnel will inspect FOSS NIR System.

- (1) Hazard: Personnel are poisoned by chemical residue from FOSS NIR System initiation.

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- (2) RAC: III/C
- (3) All Personnel will wear gloves while handling FOSS NIR System.
- (4) RAC IV/E

Condition. Place all demilitarized scrap in designated demili scrap container.

- (1) Hazard: Unburned propellant initiated by static electricity while being swept up.
- (2) RAC: II/C
- (3) Propellant will be swept up with brushes that do not accumulate static electricity.
- (4) RAC: IV/C

**K. SPECIAL REQUIREMENTS:**

- 3. When ammunition is present the Fire Department and Security Branch will be notified.
- 4. Assure the barricade tape is in place around the building and warning signs posted on all avenues of approach.
- 3. If a condition, situation, or circumstance, is regarded by the Test Engineer as being unsafe then the Test Engineer will assure the safety of the test site and personnel, seal off the test site until an acceptable plan of action is determined, and notify the Validation Engineering Division Chief.

Operation 4. Remove Demilitarized Scrap and secure test site at end of operation.

STEP NO. DESCRIPTION	SPECIFIC INSTRUCTION (SAFETY, OPERATIONAL, QUALITY CHARACTERISTICS)
1. Prepare demil scrap container transfer.	<p>Condiiton: Transfer will be completed IAW SOP MC-000L019 on army ammunition plant movement.</p> <p>Condition: Place hazardous waste sticker on each side of container.</p> <p>Condition: Remove designated demil. Scrap containers.</p>
2. Identify material Received by Nomenclature, NSN, and Lot Number.	<p>Complete DA Form 4508 (Ammunition Transfer Record) to indicate quantity of ammunition items, by lot number, that were destroyed by test.</p>
3. Palletize demil. scrap.	<p>Condition Position outer container onto pallets and secure with steel banding.</p> <p>(1) Hazard: Personnel injured by wood splinters, sharp objects or breaking banding.</p> <p>(2) RAC: II/E</p> <p>(3) Countermeasure: During banding operations, operators will wear safety eye protection, *face shield and leather or leather-palmed gloves. Personnel in the proximity of the banding operation will wear safety eye protection and *face shield.</p>
4. Place scrap into temporary storage until removed by pull crew.	<p>Condition: Move pallet or boxes with an electric-powered forklift to holding bays pending transfer.</p> <p>(1) Hazard: demil scrap mixed with ammunition items result in improper handling of explosive items and hazardous waste injuring personnel.</p> <p>(2) RAC: II/C</p> <p>(3) demil scrap will not be stored with ammunition.</p>